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Rapid Destruction of "Fireproof" Buildings

Results of the Fire in the Edison Works at West Orange, N. J.—Wood Sash with Plain Glass—Showing of Tinned Doors and Sand Concrete

BY STERLING H. BUNNELL

Last week's big news item in the manufacturing field was the destruction of the Edison factories at West Orange, N. J. The fire started by a small explosion in the film testing building shortly after 5 p.m. on Thursday, December 10. In spite of the efforts of hundreds of men, it spread rapidly to adjoining buildings until almost everything on the block was practically destroyed. The plant had been generally described as of reinforced concrete, designed and constructed to be durable and fireproof. The newspaper reports of the fire told of the complete failure of these buildings to resist the progress of the flames. Of all the structures in the block where the fire raged, but two escaped, and neither was of the much-advertised concrete. One was the old laboratory, a brick structure with wooden interior, which would have been impossible to save had it taken fire. The other was a small frame building covered with sheet metal in imitation of brick, which resisted the attack of the flames from outside, and screened the laboratory behind it.

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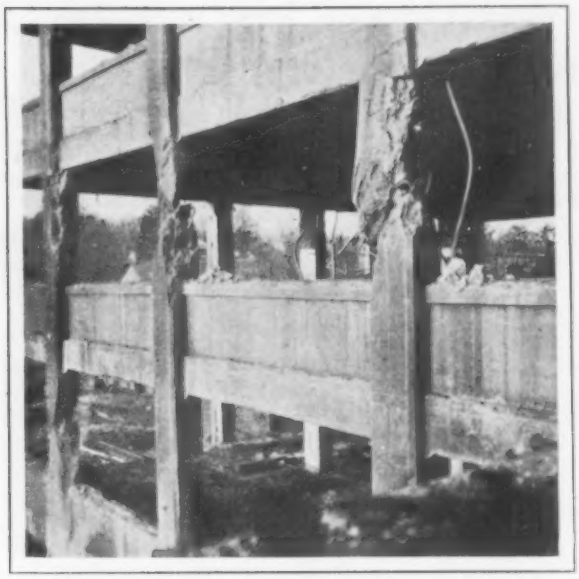
How All the Concrete Buildings Were Gutted Leaving No Sign of Windows or Window Sash

The rapid spread of the fire and the general destruction of the plant were not due to mysterious causes. No accidental combination of circumstances, or weather conditions, or peculiar hard luck, seems to have had anything to do with the magnitude of the disaster. If the plant could be reproduced today identically as it was before the fire, a similar small blaze starting at the same point would undoubtedly cause the whole affair to be repeated. Everyone knows that the fact that concrete will not burn, does not make every concrete building fireproof. The rules for constructing to prevent the spread of fire have been on record since long before the Edison fire. The lesson taught by this case is the old one of disobedience to known laws.

The Edison plant grew from one large brick building of old-fashioned construction, now known as the old laboratory, to a plant of many structures, covering portions of several city blocks. Several of these were of reinforced concrete; but others were of brick with steel beams and roof trusses or frame



Columns Without Lateral Reinforcement Sheared Diagonally

with sheet metal covering. To the east of the old laboratory, along Lakeside avenue, is the office and administrative building, 6 stories, of reinforced concrete. Next east of this comes the large shop for the manufacture of phonographs and motion picture machines, a 6-story concrete building, with 4 wings at right angles to Lakeside avenue. From the end of the east wing, an old brick building used as a sheet metal shop, extended to the north. From the end of this building the block was closed on the north side by a row consisting of a frame building, in which oils were kept; a short concrete building; a long one-story brick and steel building, known as the wax room, and a 6-story concrete building where phonograph records were manufactured. Between this building and the old laboratory stands the frame building whose sheet-metal covering saved it from destruction. There was also a 2-story brick building with steel floor beams and roof, extending from the end of the wax room to the south, nearly across the interior of the block, and some other small frame and brick buildings.

The two westward wings of the phonograph shop building were shorter than the two eastward wings, but were extended by two story additions, one of which was of brick and steel, used as a woodworking shop for the manufacture of cabinets; the other of frame, use for film testing. It was in this building that the small explosion or burst of flame occurred about 5:15 p.m. The foreman instantly ordered out the few workers and called the factory fire force. He then stepped through a doorway into the concrete wing adjoining the film building, and was turning out some electric lamps one by one, when an explosion occurred which blew in a small section of the concrete curtain wall between the two columns and extending up to the ceiling of the first floor, and showered him with fragments. The space thus opened was however limited a little further in by another wall, so that the fire did not get its hold on the large building in this way. But as the film building blazed up, the flames extended far above the roof of the 6-story shop, and threw out great heat in all directions. The concrete walls of this shop naturally were unaffected, but all the windows were of wood with plain glass lights, and gave way in all directions as the heat reached them. In this manner the interior of the building was attacked in many places at once.

The brick and steel woodworking shop, parallel to the film building,caught fire immediately through its windows, and threw its heat into the office building and the adjacent portion of the 6-story concrete shop. The entire ground floor of the shop was used for storage, packing and shipping of completed cabinets and phonographs, and was full of wooden boxes, packing material and lumber. There was also a woodworking department in the west wing above the ground floor. The heat from the wood destroyed the adjacent concrete columns in every direction. Many of them sheared diagonally, exposing the reinforcing rods, and disclosing that no horizontal rings or bands of reinforcement had been provided. Above the ground floor there was little wood except tool boxes, bench tops and blocks above shaft hangers. All of them were totally consumed, dropping the shafts to the floor. The spread of the flames was assisted by several open elevator hatches, and the absence of partition walls to subdivide the shop area. What partition walls there were resisted the flames; one dividing a veneer room from the adjacent machine shop protected the wooden shelves on the shop side of the partition so that they were hardly scorched.

Meanwhile, the fire department of the Edison works had attacked the flames promptly. The fire department of West Orange, N. J., had also been called out, though some reports are that there was a delay of as much as 11 minutes after the initial flames before the alarm was turned in. But the fire was beyond control when the department arrived. The water system of West Orange is a gravity one, with a main 8 in. in diameter leading to the Edison works district. Four engines were connected to this main, with the result that their nozzle streams would not reach above the second story. Engines were called from the neighboring cities, and were eventually connected to the mains of Orange, a thousand feet distant, whence water was sent to the fire through long lines of hose, under good pressure. In this way the buildings on the adjoining blocks were saved, and protection was given the old laboratory, which contained much apparatus and material, the loss of which would have been irreparable.

The fire progressed through all parts of the concrete machine shop, and struck across also into the adjoining and opposite buildings on the north side of the block. Several loaded freight cars in the plant helped to bridge the gaps for the flames. Only one building of the north row was of concrete, and all contained materials for making phonograph records. These buildings were destroyed except the

Everything Combustible Was Commonly Destroyed

concrete record shop, and that was badly damaged. Many of its columns sheared diagonally, exposing the vertical reinforcing rods — there were no horizontal bands to be seen. There was evidently plenty of combustible material in this row of buildings. Every vestige of wood was destroyed. All exposed structural steel was bent into worthlessness, and all brick walls fell. When the fire finally burned itself out, nothing remained on the block except the shells of the large concrete buildings, and the two buildings previously mentioned as saved. Much of the machinery in the concrete buildings can be used again; but little elsewhere escaped destruction.

THE LESSONS OF THE FIRE

In this way a plant popularly supposed to be fireproof took fire and burned completely in spite of every effort to save it. And the disaster was due to nothing else than the disregard of well-known rules for the prevention of fire loss. These rules may be conveniently cited from the Underwriters' report on the Parker building fire in New York City in 1908. The faults of construction and equipment which made the Parker building fire uncontrollable also existed unheeded in the Edison works.

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Some of the Machinery May Be Used Again, But Generally Even the Timber Fastenings for Shafting Were Consumed, Dropping Shafting and Pulleys

Interior space should be subdivided by fireproof partition walls so as to limit the spread of fire. The spaces in the Edison shops were mostly unobstructed by partitions. Where there were dividing walls, the tin covered wooden fire doors did not burn through, and fire was effectively prevented from passing that way.

Elevators and stairs should be enclosed by fireproof partitions. There were open elevator ways in the Edison works, and some unprotected stairs, which the fire left buried in cinders and rubbish. Such stairways as were enclosed showed no trace of the passage of fire. Partition walls were of cinder concrete, which after the fire could be crumbled in the fingers, while the sand concrete of the main columns was uninjured.

Quantity and pressure of water should be provided for extreme conditions. The 8-in. West Orange main was obviously inadequate to supply water enough to extinguish a large fire. The Edison works had no tank or reservoir as a supplementary source of supply. With the deficient pressure, no water could be thrown into the interior of the upper stories, so the entire building was lost as soon as the fire got up out of reach.

Windows should be of wired glass in all-metal frames. Every window in the Edison plant had wooden frames and sash, and all were totally destroyed, letting the fire into the interior of the buildings.

Combustible material should be avoided inside a fireproof building. The tool and storage boxes of the Edison works were mostly of wood, and enough wood was around the machines to make a hot fire everywhere. Much of this wood could have been substituted by steel.

No time should be lost in turning in a city alarm, after discovering a fire. Some minutes seem to have been lost while the Edison employees tried to put out the fire with their own apparatus.

Finally, even with all these matters as they were, a sprinkler system throughout the works would have saved the plant. In no other way can water be got on as quickly and accurately where wanted. It is conceded that a fire has never been known to make headway where sprinklers were properly installed. An outfit of sprinklers in the large building first attacked by the flames from outside, would have prevented the spread of the fire, and saved a loss reported as nearly $3,000,000.

It is announced that the destroyed portion of the Edison works will be rebuilt immediately. Much progress has already been made in clearing away the loose wreckage. A locomotive crane is at work night and day in the yard, loading on cars the sections of structural steel as fast as cut apart by high-temperature gas flames. Many of the employees of the works are temporarily engaged in oiling and protecting the machine tools, collecting and saving finished parts, and moving equipment into buildings on adjacent blocks not reached by the fire. It is expected that manufacturing can be resumed immediately, making use of such portions of the concrete buildings as are found to be safe.

Modified Bonus Method of Wage Payment

Making an Allowance for Uncontrollable Contingencies and Avoiding the Penalizing of a Workman for Rate-Setting Mistakes

At the final session of the Society to Promote the Science of Management at the Engineering Societies Building, New York, on December 5, Prof. Charles W. Mixter, as mentioned in the last issue, proposed a modification of the task and bonus method of wage payment which is designed to provide an allowance for unforeseen or uncontrollable contingencies and to avoid the penalizing of the workman for errors on the part of the time study man or the rate setter.

The task and bonus, as devised by H. L. Gantt, is probably the most widely used method of payment in shops using scientific management, and it also has been widely adopted in establishments that do not pretend to be operated according to these principles. Briefly, the Gantt bonus plan provides for the payment to the workman of his regular daily wage irrespective of the amount of

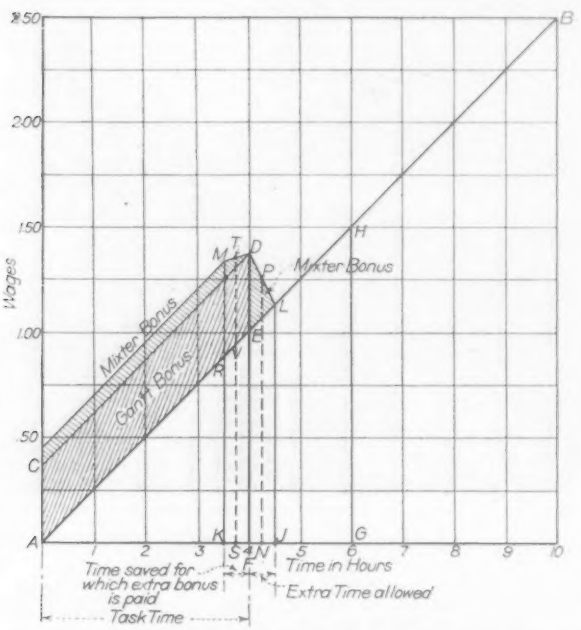


Diagram Illustrating the Application of the Mixter Bonus to a Job Set for 4 Hr. with a Rate of 25 Cents per Hour

work done. In addition, however, for performing a given job within a given predetermined time, the man is given a bonus of 35 per cent. of the time allowed for that job. That is, he is paid not only for the time allotted to the job, but is paid for the equivalent of 35 per cent. of the allotted time or task time. For completing the job in less than the task time, he receives pay for both the full task time and the bonus time. If, however, he exceeds the task time, he receives only his daily wage for the time actually expended on the job.

This is shown graphically in the accompanying diagram in which the line A B is the day wage line, its co-ordinates being units of time and wages corresponding to these units. The vertical distance between the lines A B and C D represent the bonus allowed for the completion of a task in less than the task time (in the case shown, 4 hr.) If a task time represented by the distance A F is set, the worker will receive for its accomplishment in this time, an amount represented by the line E F, and a bonus represented by the line E D. If, however, he consumes an amount of time represented by the line A G, his pay for the work will be represented by the line G H.

A numerical example will make this clear. If under the Gantt system, a task time for a certain job was fixed as say 4 hr., the workman would receive for accomplishing the job in 4 hr. or less (according to the wage scale of this diagram), $1 plus a bonus of 35 cents. If, however, his time for the work was 6 hr., he would receive $1.50, his regular hourly wage. The effect of this on the workers' earnings will be seen by considering his work for a full 10-hour day. The bonus worker, would complete 2½ four-hour jobs in one day, for which he would receive $1.35 each or a total of $3.375 for the day's work. The man who requires 6 hr. for the four-hour job would be paid but $1.50 for the completed job and $1 for the incompleted job, making his total earnings $2.50. The labor cost in the two cases would be $1.35 and $1.50 per piece respectively.

In theory, and generally in practice, this system seems ideal. The workman accomplishes his ideal of higher wages, and the employer gets what he is continually seeking, a lower unit cost of product. In practice, however, it is claimed by Professor Mixter that the system falls a trifle short of the ideal, in that it provides a penalty for the slightest deviation in excess of the task time, and in that it provides the same bonus for the man who accomplishes the task in considerably less time than the time set, as it does for the man who just manages to break even. It also assumes unvarying accuracy in the time study by means of which tasks are set and absolute control of all conditions surrounding the performance of the work. For instance in certain classes of work it is easily conceivable that variation in weather conditions, such as the humidity of the atmosphere may exercise a controlling influence on the performance of the task. It is to meet these uncontrolled variations and possible errors in time study that the proposed modification was devised. It was desired to counteract a trait of human nature which unfortunately appears in certain workmen.

It has been observed that workers under the Gantt system, who find themselves well within the task time will work at their top speed. On the other hand, workers who are closely approaching the task time, will not exert themselves particularly to reduce their time, as the reward for so doing is not sufficiently greater than that for just accomplishing the task to make the special effort attractive. Following this reasoning still further, it has been found that some workers who find that they cannot complete the task in the allotted time will deliberately slow down and consume as much time as possible without getting into trouble with their superiors. The idea seems to be that they are not responsible for the loss of bonus, and that they will "take it out" of their employer by prolonging the work as far as possible.

The modification proposed by Professor Mixter consists in gradually diminishing the bonus for a period in excess of the task time, and of gradually

increasing it for tasks completed in less than task time. This can be understood by a further reference to the diagram. In this case the variation due to possible time study errors or uncontrolled conditions, is 10 per cent. on either side of the task time. In practice the actual figure would probably be less than this. This variation is represented on the diagram by the distance F J and F K. A man requiring the time A J for his work will be paid an amount represented by the line L J, or at his daily wage rate. For work accomplished in a time less than A J, but greater than A F, as A N, he will be paid an amount represented by the line N P, or the distance between the base line A J and the line joining points D and L.

For those employees who perform the job in less than the task time up to a saving of 10 per cent. of the task time in the case under consideration, a gradually increasing bonus whose maximum is 10 per cent. of the Gantt bonus, is paid. For a saving of 10 per cent. or more, for instance, an elapsed time represented by A K, the man would receive a daily wage represented by F E, plus a bonus represented by the line M R. For a time less than A F, but greater than A K as A S he would receive a daily wage of F E plus a bonus represented by the line T V, or the distance between the daily wage line and the line adjoining points M and D.

Thus if a workman completes a four-hour task in 3.60 hr. (saving 10 per cent. of the task time), his wages will be the sum $1 for the task time plus a bonus of 35 cents plus an additional bonus of 3.5 cents, or a total of $1.38½, instead of $1.35 which he would have received had he completed the job in exactly the task time. On the basis of a full day's work, he would at this rate complete 2.78 four-hour jobs, for which he would receive $3.85 as against $3.37 for just completing the job in the time allowed. This is thought to be sufficient incentive for the workman to continue at his best speed throughout the day.

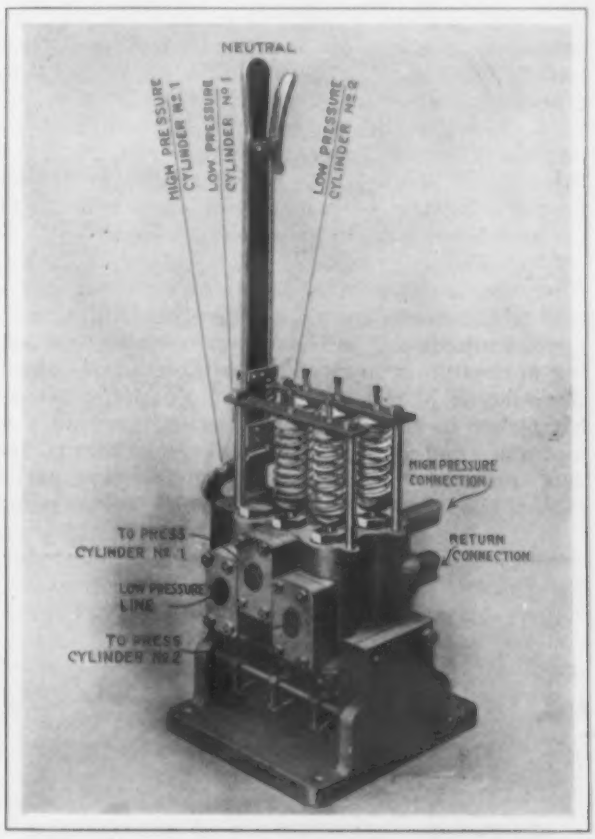
On the other hand, if the workmon found that he would exceed the task time by about 5 per cent., thereby causing him to lose his bonus, his inclination would be to make the job last as long as possible. Let us suppose that he made it last 6 hr., as before, he would receive for his day's work $2.50. His production for the day would then be 1.66 pieces and the labor cost per piece $1.50. If by the provision of the Mixter bonus, he would be persuaded to continue at a rate of speed as would insure the completion of the job in 4.2 hr., he would receive a bonus of 17½ per cent. of the time actually taken. That is, he would be paid for 4.2 hr. plus 0.735 hr., making the labor cost of the piece $1.23. The man's total earnings for the day at the same rate would be $2.92 instead of $2.50 as would be the case had he prolonged the job unduly, or $3.37 had he been sufficiently diligent to have completed his work in the task time.

Prize for "Made in the U. S. A." Trademark

In an effort to give definite form to the "Made in the U. S. A." movement which has started in various parts of the United States and in various industries, the Detroit Board of Commerce offers a prize of $500 for the best "Made in Detroit, U. S. A.," trademark submitted by an American designer. Upon the selection of the label which seems best adapted to the uses briefly outlined above, the Detroit Board of Commerce will present it to the manufacturers of the United States, to other boards of commerce, to the National Chamber of Commerce and to the National Association of Manufacturers.

New Five-Way Balanced Operating Valve

For use in connection with the pressure control of hydraulic presses, the Hydraulic Press Mfg. Company, Mt. Gilead, Ohio, has designed a five-way high and low pressure double-acting balanced poppet operating valve. It is intended for use on presses where the ram is forced in both directions



A Five-Way High and Low Pressure Double-Acting Balanced Poppet Operating Valve Designed for Use in Connection with Hydraulic Presses Where Pressure Is Employed to Force the Ram in Both Directions

by hydraulic pressure and can be used with machines of either inverted, horizontal or vertical type. The valve has five stems and checks and can be used with pressures up to 5000 lb. A view of the valve is presented in the accompanying illustration and the patterns from which the castings were made were prepared in the company's pattern shop. A special grade of bronze was used for the castings, which were poured in the builder's brass foundry.

In the operation of the valve, the low pressure is admitted to the first cylinder, the second cylinder being left open to the return line. The high pressure is turned on in the first cylinder when the low pressure has completed its work, a check preventing the liquid from the high-pressure line flowing into the low-pressure one. After this has been done, the valve can be shifted, so as to apply low pressure to the second cylinder and release the first. A similar valve, which is made with another position, enables high-pressure liquid to be admitted to the second cylinder with the first still open, although it is pointed out that in most cases this is not necessary since the work of the second cylinder is only at low pressure, as in the case of auxiliary return cylinders. On account of the length of the operating lever, the valve must be installed below the level of the operator's platform.

This company manufactures hydraulic valves and fittings to withstand pressures up to 10,000 lb.

A New Process for Coating Metals

Calorizing Forms a Layer of Aluminum Alloy as a Protective Coating Against High Temperatures

A new process, called "calorizing," for placing a protective coating on iron and steel and other metals, especially for use under high temperature conditions, is described by H. B. C. Allison and L. A. Hawkins, of the research laboratory of the General Electric Company, Schenectady, N. Y., in the October issue of the General Electric Review. In the following are reproduced some portions of the article, with a condensation of others.

"Calorizing," which is the discovery of T. Van Aller, consists in heating metals in revolving drums with mixtures containing, among other things, finely divided aluminum, so that a surface alloy containing aluminum is produced. In the case of copper, this alloy is of the nature of an aluminum bronze, but richer in aluminum than the ordinary alloy of that name and more resistant to heat, so that copper thus treated is protected up to the melting period of the alloy from the scaling which occurs when

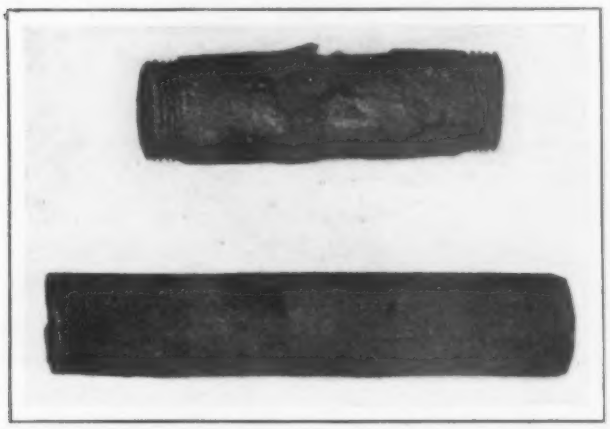


Fig. 1—Two Pieces of Iron Pipe from the Same Tube, the Upper One Uncalorized, the Lower One Calorized, Both Subjected to the Same Temperature for the Same Length of Time

untreated copper is heated above 300 deg. C. The same general result is obtained in the case of iron and steel. Some use was made of this process for treating copper soldering irons and iron resistance wires for heating devices.

Modifications of the process, extending it to further applications, have been made by E. G. Gilson, of the research department of the General Electric Company. Pieces which, because of their shape or size, are not adapted for tumbling, may be calorized by packing them in, or painting them with, a suitable mixture and heating them. Thus the size of the heater is the only limitation on the size of the piece that may be calorized. Wire or ribbon may be treated by a continuous process, by passing it through a heated pipe containing the proper calorizing mixture.

EFFECT ON IRON AND STEEL

There appear to be many places where it is desirable to use iron vessels or apparatus at temperatures above red heat, and at such temperatures ordinary iron rapidly oxides and scales away. After iron is calorized the effect of heating is slight. Instead of burning and the scale falling off, as in the case of untreated iron, practically no effect can be detected after a considerable time—certainly none which injures the surface.

This is well illustrated by the two pieces of iron pipe shown in Fig. 1, both from the same kind of pipe, but one of which was calorized. The two were heated side by side, with an ordinary laboratory blast lamp to a temperature of about 900 deg. C. for a period of four hours, then cooled and the heat once more applied for another period of four hours. At the end of that time the untreated pipe was badly burned, the point where the flame was directly applied having been reduced to one-half the original thickness, while the whole surface was blistered. The contrast between this piece and that which was calorized is very marked, for even upon close examination the calorized pipe appears to be unchanged.

In connection with the piece of calorized pipe used in this experiment it should be stated that it had previously been used in other work, where it had been alternately heated to 1000 deg. C. and cooled, in an electric resistance furnace open to the air. The total time during which the maximum temperature was maintained was about 50 hours. A rather extreme test has been applied to this same piece lately, by heating it to about 900 deg. C. and plunging it into cold water, after it had cooled to a dull red. This has been repeated three times and the surface shows no signs of cracks or any tendency to scale.

Fig. 2 shows a similar comparison between two pieces of sheet iron tube, one calorized and the other not, which were both subjected to a temperature of 800 deg. C. in a gas furnace for 100 hours. The uncalorized piece is practically destroyed, while the calorized piece is unharmed.

TESTS UNDER PRACTICAL CONDITIONS

As evidence of the performance of calorized iron under actual working conditions, the tubes shown in Fig. 3 were photographed. These are part of a small nitrogen purification plant which is in use during each working day. They are both heated by gas in a brick furnace, the larger tube to a temperature of about 800 deg. C. and the smaller to about 650 deg. C. The larger tube was calorized and has been in use over 400 hrs. with no observable deterioration, while the smaller tube, which was not calorized and which has also run 400 hrs., is badly burned. The spots are carbon deposits due

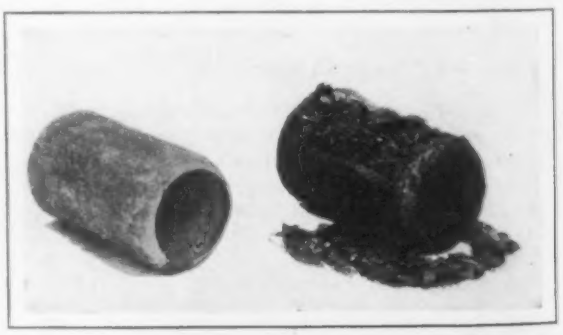


Fig. 2—Effect of 800 Deg. C. in a Gas Furnace for 100 Hr. on a Section of Calorized (Left Piece) and of Uncalorized Sheet Iron Tubes

to poor combustion in the burners. In Fig. 4 are shown these same tubes after they had run over 650 hrs. The calorized tube still shows no evidence of scale, while the other is almost burned through.

Another application of this process is to iron wire or ribbon such as is used in electrical heating units. An untreated piece of this ribbon will burn out in four or five hours at the most, whereas tests upon calorized pieces have shown that the life is increased at least fifty fold, and in the best instances over one hundred fold. The results of tests made at Pittsfield indicate that a life of over 500 hours may be expected from calorized heating units run at a temperature of 800 deg. C.

Calorized seamless iron tubing is being used for combustion tubes in the research analytical laboratory where pure oxygen is brought in contact with the metal, at temperatures from 900 to 1000 deg. C. These are thus far operated all right and still appear unaltered after nearly 100 hours' use.

The above facts seem to indicate that this is a simple method for extending the use of iron under oxidizing conditions at high temperatures, and for greatly prolonging the life in those instances where it is now used, but must be renewed at frequent intervals. In the case of small mufflers or crucibles, where temperatures are below 1000 deg. C., this treatment of cheap cast or wrought-iron shapes seems very promising. While the life of the coating depends on the temperature at which it is used, as well as on the duration of time taken in its preparation, i.e., the quantity of aluminum which alloys

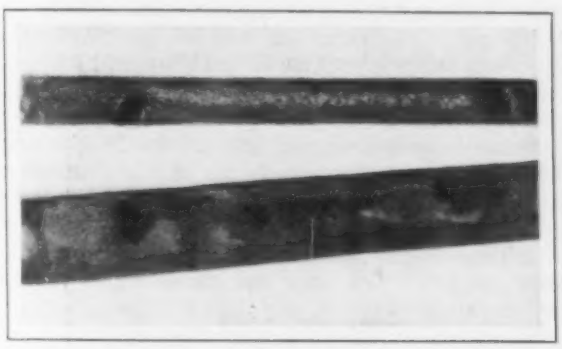


Fig. 3—A Section of Calorized Iron Pipe (Lower) and of Uncalorized Iron Pipe (Upper) after Being Heated to Operating Temperature for 400 Hours.

with the surface of the iron, it does not permit of long use at temperatures much in excess of 1100 deg. C.

COATING COPPER PARTS

Copper parts also, which are exposed to high temperature, can have their life increased by calorizing. In some cases calorized copper may be used advantageously in place of aluminum bronze. For instance, a large power station had trouble from early corrosion of its condenser tubes. These tubes were aluminum bronze and were supposed to last at least a year. As a matter of fact, while occasionally tubes would last as long as six years, other tubes would fail in four to six weeks after they had been installed. About two and a half years ago a set of calorized copper tubes was installed, and so far not a tube has failed.

In some cases the life of copper contacts can be increased by calorizing. For instance, a set of railway controller contacts which were calorized showed double the life of the ordinary untreated contacts.

EFFECT ON SIZE AND WEIGHT

The dimensions and weight of either a copper or iron piece are slightly increased by calorizing.

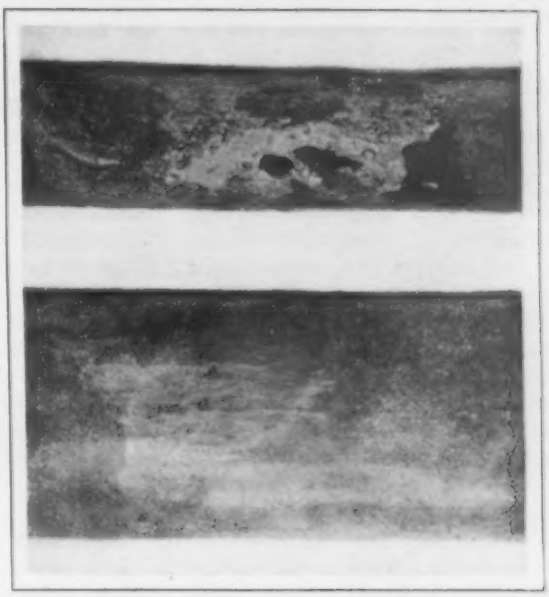


Fig. 4——Photograph of the Same Tubes As Shown in Fig. 3 (Upper Uncalorized), but After 650 Hours at Operating Temperature.

The increase of dimension is much less than the thickness of the alloy coat, the greater part of which simply takes the place of the original metal. The dimensions may, however, increase several mils and there is a tendency to a greater increase at the edges than on flat surfaces.

For iron, calorizing is intended only for protection at high temperatures. It does not compete with galvanizing, sherardizing and other similar processes for protection against oxidation or corrosion at low temperatures. Its usefulness lies within a range of temperature much higher than a galvanized or sherardized coat could stand. For copper calorizing is effective against corrosion at low temperature as well as against oxidation at high temperature. The upper limit is determined by the melting point of the alloy, which is somewhat lower the heavier the calorizing treatment, since that means an alloy with a higher aluminum content.

The probable explanation of the effect of the aluminum in the surface alloy is that a thin coat of alumina forms which prevents further burning of the metal beneath. It is well known that a pure aluminum wire may be heated in the air to a temperature several hundred degrees above its melting point without flowing, when the thin alumina shell which surrounds and supports the molten metal is easily seen.

The Majestic Mfg. Company, ranges and stoves, St. Louis, has established a fund for the relief of the dependents of employees and given an initial sum of $5000. The fund will be under the direction of a relief society formed recently by employees. The beneficiaries will be dependents of any employee who dies or is injured and who would come under the workingmen's compensation law and who has been continuously employed for at least two years. The benefits are to be 50 per cent. of his average earnings, but not less than $7 per week nor more than $15 per week for 52 weeks. If the employee's service has been more than five years the duration of the benefit is to be doubled. If there are no dependents of the employees, burial is to be at the fund's expense. The president of the company is R. H. Stockton.

A bonus for the manufacture of tin plates is proposed in Australia, a resolution having passed the Australian House of Representatives to inquire into the advisability of such a move.

TELPHER FURNACE CHARGING

Electric System to Secure a Continuous Charging of the Blast Furnace

The use of the electric telpher for charging blast furnaces is advocated by N. Kapp, Birmingham, England, in a paper offered for the autumnal meeting of the Iron and Steel Institute this year. The only way, he holds, to get a continuous stream of charging material from the bunkers or storage bins to the furnace hoppers without recharging is to split up the charge into a number of small units and to run them in an unbroken line past the coke-ovens and bunkers up to the hoppers and back again to the charging stations.

He confines himself to the description of the Bleichert system of electric telphering.

The telpher consists of a traveler, fitted with an electro-motor, which receives current (usually direct current at 110 volts) by means of a bow collector and a line wire. The skip is suspended from the traveler by a couple of hangers, and is slung in pivots in such a manner that it is in unstable equilibrium when full, and therefore upsets as soon as the catch is knocked up. When empty, however, it is unstable in an inverted position, which makes it very easy to right the skip and throw in the catch. The working of the line being entirely automatic, it is necessary for the safety of the cars to introduce a block system, similar to that on a railway, but entirely self-acting.

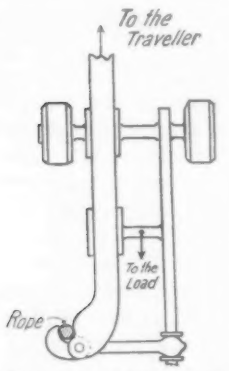


Fig. 1—Diagram of Method of Clinching the Rope

For this purpose the telpher line is divided into a number of sections, each section receiving current over a switch. The switches are of a drum type, and are turned by the passing of a car in such a manner as to cut off the current from the section it has just left. At the same time the switch gives current to the section which was deprived of current before, so that there is always a dead section behind every car, and no second can approach closer than the length of one block section. The number of these sections and block switches depends upon the output of the line.

Greater output means more telpher cars and more sections, so that the cars can move closer together. Herein lies a great advantage of this system, namely, the ease with which a telpher plant can be extended if a greater output be desired. The shortest possible distance allowable between two cars is about 40 ft. on an open track. At the charging stations or in a siding, 10 ft. is ample: 40 ft. is, however, necessary where there are points and crossings, to give time for these to work before the next car is ready to enter them. Otherwise a great deal of unnecessary stopping and starting would occur all along the line.

The working of the block switches, which effect the blocking and releasing of the cars, is extremely simple. They are no different in principle from those to be found in every hotel bedroom, one at the door and one over the bed. If we switch on at the door, we can switch out at the bed, and vice versa. This is just what the car does. It switches off the section it has just left, and switches it on again when it reaches the next section.

The most important part of the plant, Mr. Kapp says, is the ropeway incline, and a very neat method of automatically coupling the cars to the running rope is the automatic gripping device invented by Adolf Bleichert. The principle underlying this invention is that of letting the weight of the car act directly on the grip of the rope. Fig. 1 shows the principle, omitting constructive details. The gripping jaws are like the jaws of a nut-cracker. One arm of the nut-cracker goes to the traveler, and the other carries the lead. The pressure on the rope is therefore directly proportional to the weight of the skip. When the rope is to be released, the weight is taken up by a couple of rollers in connection with the one lever arm, and the jaws open and release the rope. With this system it is immaterial whether the rope used is thick or thin, and therefore the gripping power becomes no smaller when the rope is old and has decreased in diameter owing to stretching.

At the foot of the incline, where the telpher car is automatically attached to the rope, the suspension rail is bent slightly downward, so that the car cannot fail to move forward with the speed of the running rope at the point of coupling, which prevents a sudden load coming on to the rope.

At the entrance and exit of the bunkers the various telpher tracks join up by points to one suspension rail, which takes the charge to the "charge siding." Each furnace has its particular siding where the charge is built up by admitting the correct number of skips filled with ore and flux, *a*, *b*, and *c*, Fig. 2, for each furnace, until the charge is complete. This is done by one man, stationed in a signal and switch box at the entrance to the siding. As soon as the charge for one furnace is complete, the whole train is sent up to the hopper at once. The cars automatically grip the rope on the incline, at a distance from each other regulated by the block switches. On arriving at the furnace mouth where they are needed, they range up in a siding one behind the other, from which position they can be brought forward separately by means of a pull switch, and emptied into the hopper at any desired point. From here the empty skips are sent back to the bunkers on the "down" track, thus completing the loop. It will be seen that one charge never interferes with the working of another, as the motion is continuously a forward one.

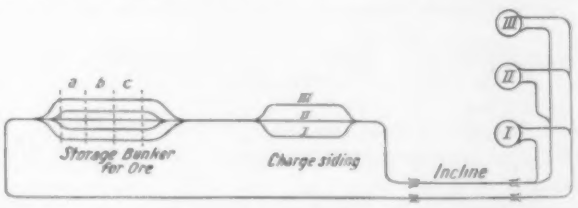


Fig. 2—Scheme of Telpher System for Blast Furnace Plant

TELPHER CHARGING OF ROECHLING WORKS

The works of Gebrüder Röchling in Völklingen, near Saarbrücken have a charging plant typical of a well-arranged telpher line. The Röchling works is one of the largest in Germany. There are five furnaces with a daily output of 240 tons, and one of 300 tons. Two further furnaces are in course of construction. Both the ore and the coke are conveyed to the hoppers by an extensive telpher plant.

The bunker is divided into 135 cells or bins, each one ending in an ore trap below. The different kinds of ore are stored in the bunker in groups. Three telpher tracks pass lengthwise below this bunker. The bunker is about to be enlarged and three further tracks added. The empty skips pass along below the ore traps, and can be stopped at any par-

ticular one by a pull switch. Here they are filled by opening the shutter in the trap and allowing the ore to slide out. As soon as a skip is full, it is sent on its way by closing the pull switch. After running back along the outside of the bunkers it comes to the central weighbridge and switch house for the ore siding. This position may be called the heart of the whole charging plant, for the foreman in charge here is solely responsible for the correct composition of all the charges, and any irregularities are traced to this one man.

The necessary composition for each furnace is determined by the furnace manager, and written down on a board by the foreman at the weighbridge, so that this man has before him a list of the ores and their weights for each furnace. As the skips, filled with various sorts of ore and flux, pass the weighbridge their weight is made up to the correct amount by adding or taking away a few lumps of ore, and they are then admitted into one of the tracks which form the charge siding, where they wait until the furnace fed from that siding needs a charge of ore. The foreman sets the weighbridge to the amount corresponding to the figures on the charge board, and prints this weight on to a weighing card when the correct amount has been made up in the skip. He cannot print a wrong figure, as the printing mechanism will not work unless the beam is poised. The weighing cards are sent up to the office every night as a check on the charge thrown into the furnaces. Each furnace has a differently colored card, so that it is easy to keep them apart. The number of the cards sent to the office must tally with the number on an automatic counting mechanism, so that the correct composition is checked in every possible way.

In order to show the switch men at the subsequent stages the furnace for which any train of ore skips is destined, a large number, corresponding to the number of the furnace, is hung on to the first and last skip of the train, at the central weighbridge. Looking down the tracks of the charge siding, rows of ore trains waiting to be sent to the hopper platform can be seen. The switch points for admitting the cars to the several tracks are worked by the man in charge of the weighbridge, which again places the correct distribution of the charge into the hands of the one responsible man.

At the outlet of the charge siding is a signal box fitted with pull switches, one for each track. The man stationed here need know nothing of the composition of the charge, or of the number of skips required. He merely waits for a signal from above, that a particular furnace requires ore, whereupon he pulls the switch of the corresponding siding until the whole train is through. The attendant can overlook all the sidings from his window. The signal system, by means of which ore and coke is ordered from above, will be mentioned later.

From the charge siding the train of skips moves toward the rope incline, where each car couples itself automatically to the running rope at distances from each other regulated by the block switches. There are three ropes in all on the "up" track, and three on the "down" track. One of these is used as a standby, and the other two are used alternately. This is done by means of an automatic point which switches the cars alternately on to one or other of the three ropeways. The point is thrown over by an electro magnet operated by a couple of block switches which are turned by the cars on passing. These automatic switch points work very smoothly without the least attention. They are of course only used in such cases where the traffic is too heavy to be dealt with by one rope alone. At the foot of the incline the rail is curved slightly downwards, so that the car may run forward and grip the rope without any sudden shock or current peak on the driving motor for the hauling gear. The rope-gripping device is that explained previously. The weight of the skip is taken up by a couple of extra rails which causes the jaws of the apparatus to open and receive the rope, which gently drops between them. As the skip is gradually lowered again off the secondary rails, the jaws close round the rope and firmly hold the skip, which is immediately carried up the incline. At the top of the incline it is released in exactly the same manner. On the downward path, the rope is gripped well before the cars come to the descent, so that there is no fear of them running away.

When a car has arrived at the top of the incline it is sent down the hopper platform to the furnace requiring the charge. Before each furnace there is a siding in which the cars stand until they are wanted. One skip after another is brought forward by means of a pull switch and tipped into the hopper.

The points for directing the cars to the proper hoppers are worked from a central switch box at the top of the incline, just as the points on a railway are set from the signalman's cabin. The switch and signal at the top of the incline is, however, important in another respect, as it contains the signalling apparatus for ordering and checking the ore trains. All the signals are given by small lamps; the system for ordering a charge of ore or coke from any of the hoppers is as follows:

Each hopper is fitted with a little lamp board with a red light and a green light, and further, three push buttons; one button for "ore," one for "coke," and one extinguishing button for "lights out." A lamp board in the switch box is in connection with all the hopper boards, so that an order for "ore" at furnace No. 3 will show a red lamp marked "ore" on the third panel in the switch box, at the same time showing a red light at the hopper No. 3. The attendant in the switch house will at once check the order by pressing a button marked "furnace 3," causing a green light to appear on the hopper board, at the same time showing a similar light at his own board. These lights are then extinguished by the man at the hopper by pressing the "lights out" button, as soon as he sees that his order has been understood and checked by a green light. In the meantime the attendant in the switch house above passes on the order to the man in the switch box below in command of the charge siding, where the charge for furnace No. 3 is presumably waiting. The system for passing on the order is exactly the same. A red "ore" light appears on a panel No. 3 below, which is checked back with a green light and finally extinguished from above. Now the attendant below sends off the train waiting in siding No. 3, and the attendant in the switch box on the hopper platform sets the points to admit the whole train into the siding in front of hopper No. 3.

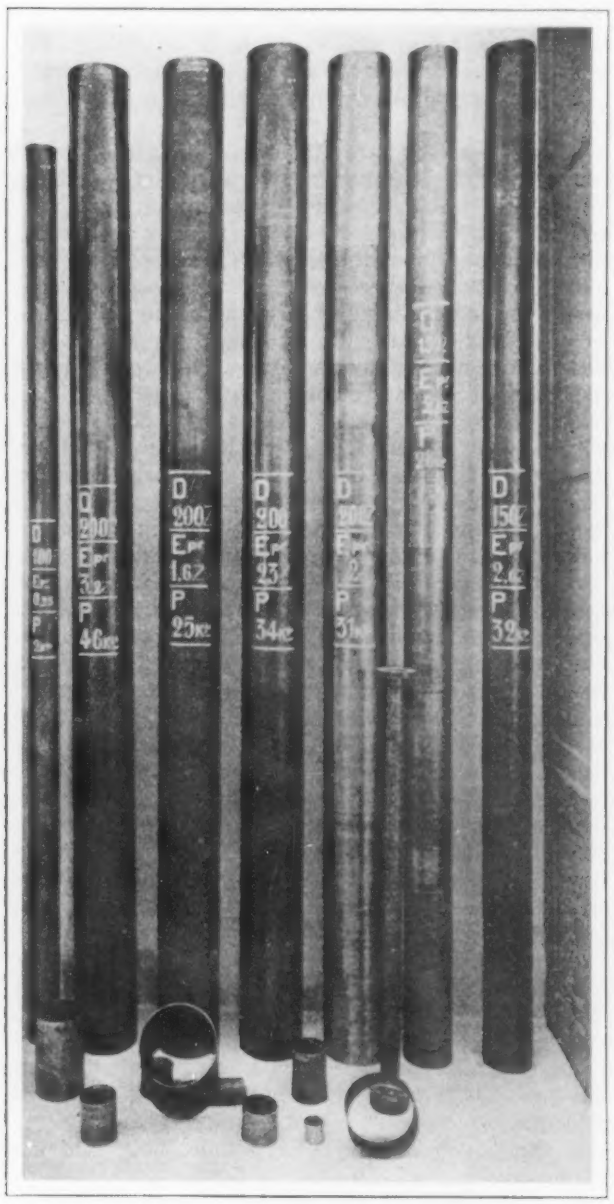
So far the signal system for ordering a charge is very simple. But when all the furnaces are in full swing, the traffic on the hopper platform is very heavy, and so the attendant wants to know the earliest possible moment when he can set the points to send the next charge to another furnace, that is, when the whole train is in the furnace siding. The hopper platform is too long to observe the cars, and by night or in a fog this would be impossible in any case. A very ingenious signaling mechanism has therefore been fitted, by means of which the attendant can see at a glance where any particular car is at any moment without leaving the hut.

Iron Manufacture by Electrolysis*

Methods Commercially Carried Out in France—Properties and Industrial Applications of the Product

BY L. GUILLET

The industrial manufacture of iron by electrolysis is a problem which has engaged attention for many years, but it is only within the last year that it has entered the practical stage. In principle, the method consists in the use of a revolving cathode and a neutral solution of iron salts, maintained in the neutral state by the circulation of the liquid over the surface of the iron. The bath also receives periodic additions of a depolarizing medium, such as oxide of iron, the object of which is to eliminate, at least in part, the hydrogen deposits on the cathode, which injuriously affect the material if present in too large a quantity. By these means it is possible to work with a current of high density (1000 amperes to the square meter), and an iron of excellent quality is obtained. The process is applicable either to the production of very pure iron, which can compete with the best iron and Swedish iron, or to the direct manufacture of tubes and sheets in the finished state. It has emerged from the laboratory stage, and is now being put into operation on an industrial scale.



Commercial Tubes of Electrolytic Iron

PROPERTIES OF THE METAL

Using any pig iron in solution, an electrolytic iron can be obtained of the following average composition, after removal of the gases by annealing:

	Per cent.
Carbon	0.004
Silicon	0.007
Sulphur	0.006
Phosphorus	0.008

At the present time it is possible to guarantee phosphorus lower than 0.010 per cent. With a density of current of 1000 amperes per sq. m., the yield per kilowatt-year is 2 tons of metal, including the cost of current for the accessory services, particularly for the rotation of the cathodes.

The material in the crude state, that is, in its state on removal from the electrolyte bath, is hard and brittle. In fact, two effects are produced in the process of manufacture. The metal is interstrained and has absorbed gases, particularly hydrogen. On heating in vacuum between 800 and 1100 deg. C. for four hours, and then raising it to the neighborhood of 1400 deg. C. for a further two hours, Sir Robert Hadfield found that 34 grams of the iron had a volume of 4.3 cc. and yielded 28.8 cc. of gas of the following composition:

	By volume Per cent.	By weight Per cent.
Hydrogen	18.8	65.3
Carbon monoxide	7.4	25.7
Carbon dioxide	0.2	0.7
Nitrogen	2.2	7.6
Oxygen	...	...

The presence of carbon monoxide is somewhat noteworthy. On its removal from the electrolyte, the iron is very brittle, and has a Brinell hardness of 193, using a ball of 10 mm. diameter under a load of 3000 kgs. The micrographic examination reveals an entirely characteristic structure, consisting of innumerable fine needles, very much resembling martensite.

After annealing for two hours in magnesia at 900 deg., the iron shows a Brinell hardness of 90. The micrographic structure is perfectly normal. The tensile test gives a breaking strength of 30.9 to 32.8 kg. per sq. mm., and an elongation of 40.2 to 42.1 per cent. in the direction of the axis of the tube. Further, the annealed tubes, when subjected to compression tests, can undergo deformation to an extraordinary degree without a sign of any fracture as shown in one of the illustrations.

INDUSTRIAL APPLICATIONS

The industrial applications of electrolytic iron fall into three principal categories: (1) the direct manufacture of tubes; (2) the direct manufacture of sheets; (3) the preparation of pure iron as a

*From a paper prepared for the abandoned fall meeting of the Iron and Steel Institute at Paris. The author is professor of metallurgy at the Conservatoire National des Arts et Métiers, Paris.

raw material intended for fusion. There are various other uses of less importance, such as the preparation of rods of very pure iron for autogenous welding.

Tubes.—The manufacture of tubes is being proceeded with on an industrial scale by the Bouchayer & Viallet Company, whose installation is capable of turning out 100 tubes per day. The current practice of this company is to manufacture tubes 4 in. long, 100 to 200 mm. in diameter with a thickness of 0.1 to 6 mm. Some of these are shown in one of the illustrations. As is well known, all present methods of manufacturing tubes present certain insurmountable difficulties when it is desired to obtain regular thicknesses of less than 6 millimeters. As a general rule, in the products obtained the thickness of the wall is far from constant. With the electrolytic process it is possible to obtain the most satisfactory regularity whatever the thickness, diameter, and length of tube.

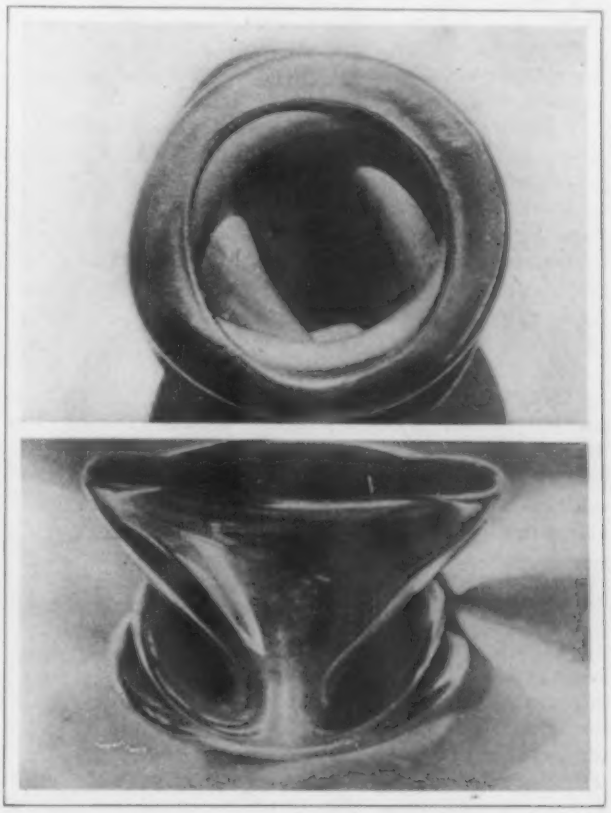
The tubes will withstand considerable pressures. Thus, a tube of 100 millimeters diameter and 0.75 millimeter thickness, subjected to 1200 pounds per square inch, underwent a permanent deformation of a regular character, as if squeezed in a press. Another specimen of the same tube was exposed for two and a half months to a temperature of 120 deg. in a boiler. It was then tested to 1200 lb. per sq. in., but no trace of fracture was perceptible.

Sheets.—The manufacture of sheets is under investigation, but no doubt the researches in the industrial laboratory will lead to a method by which they can be produced commercially. The importance of being able to obtain sheets direct without rolling will be appreciated. The iron is of first-class quality, capable of undergoing very considerable deformations in the cold. Tests on tubes and plates have been made in the draw bench, and it is surprising with what facility the metal can be worked. The material is therefore highly suitable for purposes of stamping, both in the form of plain annealed plates (black plates) or of tinned plate. Finally, on account of their purity, these sheets are especially adaptable for use in the construction of electric machinery. Dr. Max Breslauer of Berlin has demonstrated the important aspect of this question, both from the point of view of magnetic properties and of regularity of thickness and compressive strength. The efficiency of alternating motors and transformers, and also of direct current motors, is increased by using this material in their construction. He concludes that the use of electrolytic iron constitutes a real progress, both as regards hysteresis and permeability. In transformers the saving in weight of material is 33 to 40 per cent. The capacity of alternating motors can be increased by 50 per cent., running at the same temperature, and occupying the same space. In direct current machines, 16 per cent. of the iron can be saved.

As a Raw Material for Fusion.—Without doubt electrolytic iron will be able to compete successfully with Swedish iron. The quality is much more regular, and the crude metal, being very brittle, can easily be broken into pieces of any required size, however small, and, at the same time, it can be supplied in suitable thicknesses. The cementation of such products would be more regular than those ordinarily used. Tests made at various steelworks have shown that tools and special steels manufactured from this material give results at least equal to those obtained with Swedish iron. The cost price is the only remaining consideration.

COST OF MANUFACTURE

The principal factors which make up the cost price are the electric energy and the pig iron. It has already been mentioned that 2 tons of extremely pure iron can be produced per kilowatt-year. Using a current of 500 amperes per square meter, instead of 1000 amperes, the voltage drops to about one-half, and the production per kilowatt-year is nearly doubled. Working with a still lower density, the yield can be even further increased. In countries where the cost of motive power is high, it would pay to work at 500 amperes or even less. It would then be possible to produce 3 to 4



Results of Crushing Tests on Electrolytic Iron Tubes

tons, and even more, per kilowatt-year. If the cost of the unit be taken at 1 centime (0.1d.), an ordinary figure in the Alps, and using a current density of 1000 amperes, the cost of current would not exceed 43 francs per ton of iron produced. Since pig iron is used as the raw material, it may be reckoned that there is about 10 per cent. of waste in the form of sludge, graphite, etc. The price of the pig iron would vary according to the locality, and in the mountainous country it would run at about 64 to 88s. per ton. The price, however, would be higher in those localities where the electric current was cheapest, and vice versa. The average outlay on pig iron per ton of electrolytic iron would therefore be from about 72 to 80s. To this would still have to be added the cost of labor, maintenance, cost of electrolyte, depreciation, and interest on the capital cost of the plant. These various amounts have not yet been definitely ascertained, but the total cost price, based on current prices for material and labor, of the electrolytic iron, in the condition in which it leaves the electrolyte bath, would probably not exceed £6 to £7 12s. per ton, according to the locality.

Comments by Sherard Cowper-Coles

The secretary of the Iron and Steel Institute makes public the following as the substance of a

communication sent to him by Sherard Cowper-Coles, of Sunbury-on-Thames, England, in which exceptions are taken to some statements in Professor Guillet's paper:

Mr. Sherard Cowper-Coles wrote that he considered the paper by Mr. Guillet very misleading in some of its statements. In 1908 he (Mr. Cowper-Coles) read a paper before the Iron and Steel Institute entitled "The Production of Finished Iron Sheets and Tubes in One Operation," describing in considerable detail his electrolytic process for the direct production of iron tubes, cylinders and sheets. In that process a mandrel revolving at a critical speed, so as to give sufficient skin friction between the electrolyte and deposited metal was employed to obtain a close homogeneous deposit and at the same time enable a high current density to be employed, the solution being kept neutral by bringing it in contact with iron oxide as described in Mr. Guillet's paper. In the following year, Mr. Boucher approached him (Mr. Cowper-Coles) regarding the process and asked if he would grant him a license to work it in France and Switzerland. This was done and a small trial was thereupon set up in Switzerland and Mr. Boucher produced a number of tubes. A company was ultimately formed, called Le Fer, to acquire the license that had been granted to Mr. Boucher.

Mr. Cowper-Coles's object in setting out these facts is to show that all the preliminary work was carried out in Great Britain at great expense and much labor. That that was so could hardly be gathered from what he thought was a somewhat ungenerous statement which constituted the only reference to the process in Mr. Guillet's paper:

"In 1907 Mr. Cowper-Coles took out a patent involving the use of a 20 per cent. solution of sulphocresylate of iron and endeavored to manufacture weldless tubes, using a rotating cylindrical mandrel. This process which was analogous to the Elmore process for making copper tubes has not yielded results of much importance."

The Cowper-Coles process, he continued, is in no way analogous to the Elmore copper process which consists in using an agate burnisher. He thought it should be known that the process described in Mr. Guillet's paper had been worked out in England, and that works are to be erected in the Midlands to carry out the process on a commercial scale. He (Mr. Cowper-Coles) had all the necessary documents for proving the statements he had given.

A Small Air Compressor of the Portable Type

The Ingersoll-Rand Company, 11 Broadway, New York City, has developed a portable air compressor which is driven by a small gasoline engine. It is designed particularly for the needs of a contractor doing work of a temporary character where compressed air in small quantities is required. The compressor is a self-contained unit and is operated by a single-cylinder gasoline engine that is coupled directly to it, both pistons working on the same shaft. It has a capacity of 45 cu. ft. per min., at a pressure of 90 lb., and is fitted with an air unloader. The engine, which is of the marine type, operates on the two-cycle principle and has a centrifugal governor. An automobile type radiator, assisted by a large fan, together with a gear-driven pump, provides the necessary cooling for both the compressor and the engine.

After suffering the loss of nearly 1500 lb. of babbitt metal by mysterious thefts at its Reliance works in Milwaukee, the Allis-Chalmers Mfg. Company has finally been able to put a stop to depredations by the arrest of several employees. The babbitt, all in 5-lb. ingots, was carried away in dinner pails or wrapped in working coats.

GRINDING SAFETY DEVICES*

The Increased Efficiency and Economy Obtained from Their Introduction

BY CHARLES G. SMITH†

Some years ago the writer made a very extensive series of practical tests of grinding wheels. In one of these a bar of steel was held with uniform pressure against a coarse wheel which was operated at a peripheral speed of 3000 ft. per min. The speed was increased in steps of 500 ft. per min. until a rate of 8000 ft. per min. was attained. At each of these speeds the amount of emery sacrificed from the wheel was taken and the cubic inches of the metal that was removed calculated. At that time 5000 ft. per min. was commonly accepted as a reasonably safe speed. Increasing this figure to 5500 ft. gave an increase in the efficiency of approximately 10 per cent. Increasing the speed 20 per cent., or to 6000 ft., produced a gain in the efficiency of from 35 to 40 per cent. and at 6500 ft. the gain was 70 per cent. At 7000 ft. and over the efficiency seemingly decreased as the wheel appeared to melt the steel to such a degree that the metal would flow into the pores of the wheel and load it so as to kill the cutting qualities. To operate the wheel at a speed of 6500 ft. per min. it was necessary to use the tapered side type of wheel with concave steel flanges, tapered ¾ in. to the foot on each side. The additional weight of these tapered flanges makes it imperative to have heavier spindles to accomplish the required results, and experience has shown that for removing heavy gates from castings a spindle of not less than 2 in. in diameter should be used, having bearings approximately 12 in. long.

The use of grinding machines on any other than the ground floor is bad practice, unless the floors are rigid enough to prevent any vibration, as this makes it difficult to keep the wheels true. Where possible, the machine should be mounted on a concrete foundation and these foundations will pay for themselves in the saving of emery that it is necessary to dress away to keep a wheel true.

The matter of power is an important factor and should be given careful consideration on all types of machines. In the installation of belt-driven machines it is more economical to put in a machine with belts of a sufficient width to transmit enough power to do the heaviest work the machine will be called upon for.

The holes in the wheels for mounting should not be so small as to require the application of force to get the wheel on the spindle, nor should they, on the other hand, be too large, for if so the wheel will drop down before tightening the nut and cause it to be out of true. Another matter in the mounting of wheels that is important is the mounting of the flanges. The inside flange should always be cleaned as well as the inside of the outer flange and both sides of the wheel brushed, as when the nut tightens the flanges against the wheel any particles of foreign matter or irregularities of any kind will have a tendency to break the wheel. All flanges, whether straight or tapered, should be recessed on the inside 1/16 in., and the diameter of this recess should be at least two-thirds that of the flange, thus permitting the flange to bear on the wheel at its outer part.

The Robbins & Myers Company, Springfield, Ohio, states that the newspaper reports of its fire are misleading. The electrical plant was not damaged, and no interference will be suffered in filling orders for motors, generators and fans. Arrangements have been made with adjoining manufacturers for the use of their foundries until the company can rebuild its own. The only delay will be in transferring patterns to these foundries. The work of cleaning was begun on Monday in preparation for the construction of a new modern foundry plant. The loss was entirely covered by insurance.

*From a paper presented at a meeting of the Detroit Foundrymen's Association, December 10, 1914

†President and general manager Pittsburgh Emery Wheel Company, Rochester, Pa.

Death of Charles A. Moore

The death of Charles A. Moore, president Manning, Maxwell & Moore, Inc., New York, while a passenger on the Holland-American line steamer Rotterdam, was made known in New York by a wireless message dated December 8. The ship sailed from New York December 1. Heart disease was given as the cause of death in the brief dispatch. Accompanied by Mrs. Moore, he was en route to Naples, Italy, where it had been his custom to spend the winters to escape the inequable weather of this climate. For three or four years he had not been in good health and had relaxed the close attention he previously had given to business and his many other interests. He returned from Europe last April and went to his country home at Greenwich, Conn. His age was 68 years.

CHARLES A. MOORE

In his busy years Mr. Moore was active in Republican politics, especially in Brooklyn where he formerly lived, and in social life. He was a close friend of President McKinley and for several years was president of the American Protective Tariff League, to which he gave ardent support.

Mr. Moore was born on a farm in the little town of West Sparta, N. Y. Following the death of his parents, he was sent at the age of 12 years to Lynn, Mass., to be educated by an uncle who was principal of a high school in that city. In 1862 he enlisted in the United States Navy and served until the end of the civil war. He spent fifteen years of his early business life in New England, after which he removed to New York, seeking wider opportunities. At Boston he was connected with the manufacture of steam specialties, the products of the Ashcroft Mfg. Company and the Consolidated Safety Valve Company, and had a wide acquaintance among consumers of these goods.

The firm of Manning, Maxwell & Moore, of which Mr. Moore was the head for many years, was the outgrowth of the engineering and manufacturers' supply house of H. S. Manning & Co., which was located at 111 Liberty street, New York, and which dated back to 1873. The original firm's line was largely confined to dies, taps and bolt-cutters which gave little suggestion of the later extensive operations in machine tools, steam specialties, railroad and miscellaneous engineering supplies in which a world-wide business was to be done. In 1881 the firm name was changed to Manning, Maxwell & Moore, the partners being Henry S. Manning, Eugene L. Maxwell and Charles A. Moore. Mr. Maxwell's death in 1895 left the business in the hands of Messrs. Manning and Moore. Mr. Manning retired in 1905.

While the corporation, as it is now, is known as a dealer and distributer of machinery and supplies, it has control in a number of companies manufacturing specialties. These are the Shaw Electric Crane Company, Muskegon, Mich., manufacturer of cranes; the Pedrick & Ayer Company, Philadelphia, air hoists, cranes, air compressors, compressed air riveters and other pneumatic tools; the Ashcroft Mfg. Company, steam gauges, recording gauges, and other engineers' appliances; the Consolidated Safety Valve Company, pop safety valves; the Hancock Inspirator Company, Boston, manufacturer of the Hancock inspirator and the Hayden & Derby Mfg. Company, manufacturer of the Metropolitan injector. A few years ago Manning, Maxwell & Moore purchased the Putnam Machine Tool Company, Fitchburg, Mass., one of the oldest makers of machine tools in the country, for which a new and model plant is now being constructed. The company for some years had control of the Pond Machine Tool Company, Plainfield, N. J., but this was sold to the Niles Tool Works Company interests in 1898 and became part of the Niles-Bement-Pond Company. Mr. Moore was also connected with the Windsor Machine Company, Springfield, Vt.

Mr. Moore was one of the founders, and for ten years president of the Montauk Club, Brooklyn, N. Y.; and when he relinquished the office a dinner was given in his honor at which Dr. St. Clair McKelway gave him the following tribute: "The broadmindedness of this man is matched by versatility. He is a master of business. He has a genius for organization. He is prodigiously efficient in execution. He can incite men to their very best and he gives to every cause his very best and develops it to the limit. He is a broad man. He is a patriot. He believes in old America, young America, and in ultimate America. He believes in the United States from Rio Grande to Portland and from San Juan to Manila. Great men are his friends, but he has never been their sycophant. He has been their coadjutor, but he has declined to become their aid or assistant, because he would rather be master of his own home than sustain any part, however exalted, in subordinate relations to others. He has been replete with service. He is almost a miracle of inspiration. He is in many respects incomparable, and in all an admirable man."

Mr. Moore was a chevalier of the Legion of Honor of France, vice-president of St. John's Guild, and a member of the American Society of Mechanical Engineers, the Sons of the Revolution, the Ohio Society, the New England Society, the St. Andrews Society, the Society of Genesee, the New York Chamber of Commerce, the National Association of Manufacturers, and several clubs.

Mr. Moore leaves his widow, two sons and two daughters. The sons are Charles A. Moore and Eugene M. Moore. The daughters are Mrs. Colby Chester, Greenwich, Conn., and the Duchess Maria Torlonia, Naples, Italy.

S. DIESCHER & SONS.
Mechanical and Civil Engineers,
PITTSBURGH, PA.

Briquettes in Blast-Furnace Practice

German Experience in Consuming Flue Dust from the Fine Ores of the Minette District

An elaborate description of the blast-furnace equipment of the Gelsenkirchen Bergwerks A. G. at Esch, Luxemburg, and Deutschoth, Lorraine, with special reference to the new installation of the Adolf-Emil-Hütte is contributed to Stahl und Eisen for August 6 and 13, by Max Zillgen, chief engineer at Esch. It contains an account of the experience of the Adolf-Emil-Hütte in consuming the flue dust from the use of the fine ores of the Minette district by means of briquettes. The following is a translation of that portion of the article:

Two theories prevail regarding blast-furnace practice in the Minette district of France; one advocates slow blowing in order to keep down the loss by flue dust, the other favors faster driving and the carrying away of the harmful dust with the furnace gases. The latter is the better. The formation of flue dust is not the immediate result of blowing with higher pressure; for example, 200 tons of iron can be produced per day as well with small tuyeres at 50 cm. pressure as with larger tuyeres at 25 cm. pressure with no change in the amount of flue dust produced. The formation of flue dust is much more a result of high gas velocity. The greater this velocity the greater is the active force within the current of gas, with the result that proportionally more dust is taken up and carried with it.

The quantity of dust is also naturally dependent on the percentage of fine ore, which generally amounts to not less than 15 per cent. in the case of Minette ore. Because of the dust expulsion with fast driving, the ratio of ore to coke can be made correspondingly higher, so that the lower metallic output from the charge, due to the loss of flue dust, does not bring about worse coke consumption. Faster driving has, moreover, the advantage that the heat loss per ton of pig iron through radiation is much smaller and, more important that anything else, the column of the charge is looser and more porous.

RATE OF BLOWING AND FURNACE HANGINGS

With slow blowing considerable resistance is offered to the passage of the gases by the fine material. This resistance is so great at times that the gases try to find an easier way through the lump ore. Colder portions are thereby produced locally that descend unreduced and lead to scaffolds and furnace troubles. With higher pressure the smelting and reduction processes are more active and, undoubtedly, the blast will be at a higher temperature because of being forced more strongly against the bricks in the stoves. It is therefore correct to reduce the size of the tuyeres, with a decrease in the size of the furnace, to such an extent that notwithstanding less blast is delivered, it may enter the furnace at equal pressure (as with larger furnaces), so that, through the slower rate, very good direct and indirect reduction can result. Naturally, as the blowing with smaller tuyere capacity is slower, more coke should be charged because, otherwise, there will not be sufficient fuel present to reduce the finely divided ore that will descend with the charge due to the decreased gas velocity.

Most of the operating troubles experienced when smelting Minette ores are caused by dust obstructions which are mainly experienced when using bad coke, especially too soft coke, and bring about a cold furnace with pronounced hanging. Of the other causes of furnace hanging, that of insufficient blast may be mentioned, which generally brings about only a decrease in output without greatly affecting the quality of the iron. Insufficient blast can, however, lead to greater troubles if, through hanging, a general stoppage of blast and gases is brought about. Further, it may produce so-called cold hangings, when either the ratio of ore to coke is too great, or the furnace has become cold through the slipping of scaffolds. Moreover, hanging can result from a basic gangue and a continuation can lead to the most serious trouble. In bad cases, just as with heavy dust accumulations, the blast can find no passage, and a gradual cooling of the hearth takes place, so that slag and iron casts are lost. In such cases it is necessary to forcibly keep up the smelting operations, and provide passage for the blast in any way whatever. In the majority of cases this is most easily accomplished by boring through the brick work, beginning at the shaft and working downward as far as necessary until the blast has found entrance. At the same time it can be determined whether deposits have already formed.

CHARACTERISTICS OF THE FRENCH ORE

At the Adolf-Emil-Hütte about 50 per cent. of French iron ore is used from the St. Pierremont mine. Experience with this ore has shown that, because of its high content either of carbonate or silicate of iron, it allows very favorable indirect reduction. The ratio of ore to coke can therefore be raised by two-tenths, which improves the coke consumption correspondingly. A bad feature of using this ore, however, is that it falls to powder very readily and thereby leads to bad furnace operation. It is, therefore, necessary when smelting such ore in large furnaces to provide adequate blast at sufficient pressure because of the higher consumption of oxygen due to the extensive indirect reduction, and, also, to overcome resistance due to the disintegration of the lump ore into fine particles. A proof of the good indirect reduction obtained with this French ore is the very high ratio of CO_2 to CO in the top gases that seldom goes below 0.8 per cent.

As to the breaking down of the ore into powder two causes are effective. The heating brought about by the gases causes a part of the moisture and combined water in the ore to be changed to steam, which cannot escape and produces small explosions that burst the pieces of ore. Also the indirect reduction contributes to this disintegration of the ore.

BRIQUETTING THE FLUE DUST

The effort to overcome the increased loss brought about by high flue dust production by rendering this dust usable has become very extended, and the problem of the future will be to bring into lump form not only the flue dust but also fine ores (below 2/5-in. grain size), whereby the running of the furnaces will be greatly benefited. With a daily

output of 200 tons a flue dust production of 150 kg. per ton can be expected. The dust contains 36 to 40 per cent. iron, so that the making of this material usable appears to be an important economic question. The cost of operation, with the low price of ores in the Minette district (50c. per ton), is very important. On account of the low first cost of plant, and the easy reducibility of the product, briquetting is to be preferred to sintering or nodulizing. At the Adolf-Emil-Hütte a Tigler press was recently put in operation and the results, as to capacity, have been entirely satisfactory. The strength of the briquettes has been such that when using them in the furnace no greater amount of flue dust can be noticed. The cost of production already is lower than the cost of ore. In this connection it must be borne in mind that briquettes with about 36 per cent. iron, 1 per cent. manganese and 7 per cent. coke should be regarded as material of higher value than ore.

The flue dust is briquetted by the Schumacher process, an addition of 0.5 to 0.8 per cent. magnesium chloride being sufficient, that is, 1.5 to 2.5 per cent. of the usual commercial magnesium chloride liquor. This process has also shown that the dust separated in wet cleaning, added to the flue dust as mud, together with a little gypsum, is able to institute the process in that it possesses sufficient catalytic properties. I am of the opinion that the process is one of hydratization, if not one of oxidation. It is certain that the higher the iron contents, that is, the further the reduction of the iron compounds has proceeded, so much the better are the briquettes that can be produced, notwithstanding that, when this is the case, the percentage of natural binding material in the flue dust is correspondingly lower. It is less suited to dust which is but little prereduced and, therefore, makes difficult the formation of higher oxidized products.

It is recommended that the iron content be increased through the addition of waste products, such as converter spittings, that are in fine condition after they have been magnetically separated. Also the very marked development of heat gives evidence of a more extensive chemical reaction than that of a simple binder. This heat development and chemical action can be favored by intense pressure and with such pressure, as is obtained in the Ronay process it is possible, even without the admixture of catalytics, to produce very good briquettes, the best I have seen up to the present. Unfortunately sufficient output cannot be obtained with the Ronay press. There remains the problem of increasing the effectiveness of the press through the artificial production of heat, in order to increase the solidity of the briquettes.

Regarding the smelting of the briquettes in the blast furnace, a briquette is to be preferred to sintered or nodulized material. Apart from its easy reducibility the briquette contains 6 to 8 per cent. coke mixed through it, which brings about a direct saving in fuel. The advantage claimed for sintering that all the dust (either dry or wet) can be used is no longer effective for, at present, with the large dust catchers, over 90 per cent. is separated dry and the remainder, obtained as mud in the wet cleaners, can be used with it to advantage in briquetting. It still remains to be pointed out that sinters or nodules are higher in iron units, whereby the metallic output can be improved, but it should not be overlooked that the saving in the coke tried for in this way is completely neutralized by the higher coke consumption needed for direct reduction because indirect reduction of these products is almost impossible.

OPERATING RESULTS WITH BRIQUETTES

Further, as to the operating results obtained with the use of briquettes, the time has been too short to afford sufficient experience for any final conclusion, but those obtained up to the present time have already shown that the output and the coke consumption are improved. Up to 15 per cent. of briquettes have been added, which act as an acid constituent of the charge, and corresponding amounts of acid ores were removed. At each second loading about 30 per cent. of the charge was composed of briquettes whereby the basicity of the slag, and production of flue dust remained the same, which may be taken as an impressive proof of the usability of the briquettes.

When it is considered that the flue dust production with large furnaces amounts to 7 or 8 per cent. of the charge, and that the rendering of it usable means a longer life for the mines in the Minette district, the following figures, which illustrate this point, may be of value. If the iron ore supply in Luxemburg is estimated at 300 million tons, and in Lorraine at 2.3 billion tons, then the total supply in this district is about 2.6 billion tons. With a yearly requisition of 26 million tons there would be about 2 million tons of flue dust carried off with the waste gases. This corresponds to a yearly pig-iron production of 700,000 tons or 70 million tons pig iron for the whole ore supply. Therefore with a constant pig-iron production the rendering available the flue dust will lengthen the life of this mining district by ten years.

To the Plumbing and Heating Trades

The attention of manufacturers of plumbing and heating supplies is called to some matters of considerable importance by the Central Supply Association. One of the heavy expenses to which wholesale houses are periodically subjected is the compilation and issuance of a catalogue. It has too frequently happened in the past that a house has scarcely issued its catalogue than the manufacturers' price lists on some prominent line have been revised or completely changed. This has caused such houses to expend much money in issuing supplementary information regarding the changes. With a view to eliminating such waste and inconvenience, the Central Supply Association requests that all manufacturers contemplating the change of any lists be requested to make such change on or before January 1, 1915; that such lists in existence January 1, 1915, be continued until January 1, 1920, and that thereafter no changes shall be made except at the termination of five-year intervals. If all manufacturers will carefully consider this request and act accordingly their interests as well as the convenience of the wholesale houses handling their goods will be greatly enhanced.

Attention is also called to the fact that a number of States, for the purpose of protecting the interests of their citizens, have passed laws in reference to the branding of goods, making it a misdemeanor if the brands do not specify exactly what the article represents. Not only the inconvenience but the liability which now confronts wholesale dealers who have on hand goods which have been misbranded has led the Central Supply Association to pass the following resolution to which the attention of manufacturers is urgently called: "That whenever any manufacturer brands his goods as to capacity, size or weight he should brand them the exact capacity, weight or size." No reputable manufacturer, it is believed, would willingly subject a distributer to the risk of being declared a law breaker.

Secretary Paul Blatchford, 139 North Clark street, Chicago, will greatly appreciate advices from manufacturers, particularly with regard to price lists, in order that he may keep the members of the association informed as to any pending changes.

Steam Shovel Electric Lighting Plants

To enable steam shovels to be used for night work, the Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa., has adapted its 1-kw. general utility turbo-generator outfit for mounting directly on the shovel to supply the local lighting required. The set is fastened to the underside of the main shovel frame, as shown in the accompanying illustration, and receives steam from the boiler supplying the shovel.

This arrangement was devised as a solution of one of the problems which the Utah Copper Company encountered in operating its steam shovels at night. At this mine the shovels worked on terraces that have been cut in the side of the mountain and dig from a bank in front, which must be loosened by heavy blasts. The general illumination of the bank was furnished by a battery of projector searchlights located on the opposite side of the canyon from which the shovels dig, but to supply local illumination for the shovels to permit necessary inspection and adjustment and afford safety for the workman, about 20 incandescent lights were placed on each shovel. To get a supply of current for the lights was somewhat of a problem due to the fact that the shovels were in motion. A method was devised of mounting a reel which carried a semi-flexible cable on each shovel. One end of the cable was attached to a power circuit carried by poles and the cable unwound along the ground as the shovel proceeded. This arrangement, however, was not altogether satisfactory, as rocks rolling from one terrace to another would carry away wires or poles, and blasts would frequently throw rocks that would damage the cables along the ground. Accidents of this nature were costly, not only on account of the replacement required, but frequently individual shovels would be put out of commission when rock disturbed by another shovel on a higher level crashed through the feeder line.

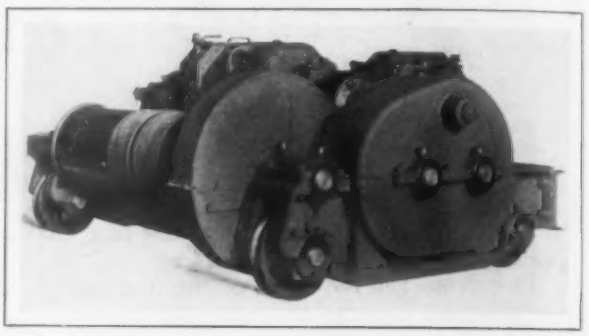
In December, 1913, one of these turbo-generator outfits was supplied to the company on trial, and no attempt was made to supply the shovel with any other electric power. The record made by this outfit was such as to warrant its purchase and the placing of orders for six more. The saving, aside from the elimination of delays in operation formerly caused by the failure of the lighting system, is about 50,000 ft. of No. 8 wire annually.

A Steam Shovel Equipped with a Turbo-Generating Set for Operating the Lights

These sets will operate an arc lamp and a small number of incandescent lights simultaneously or approximately 40 lamps each having a capacity of 25 watts. It is pointed out that no attention is required for the set because it is designed to operate for long periods without care. No fine adjustments have to be made and all of the parts are readily accessible for inspection. The full output of the set is developed on steam pressures ranging from 90 to 250 lb. The speed is kept uniform by a governor and a fixed resistance regulates the voltage which is further adjusted by a rheostat to take care of variations in the number of lamps in use.

Crane Trolley with Safety Features

The Northern Engineering Works, Detroit, Mich., has made a number of improvements in its type E crane trolley. All the gears and other moving parts have been inclosed to protect them from dust and grit and run in an oil bath, and one of the features is that the covers of the gear cases must be in place or the gearing cannot run. The trolleys are built in capacities ranging from 2 to 125 tons for either mill or standard service, and those of the former type have axle bearings of either the vertically or horizontally capped MCB type, according to the work they are to do.



An Improved Type of Trolley for Mill Cranes Having a Number of Features Making for Safety

Each train of back gears is mounted in a single frame, and the bearings which are bored in line are capped and fitted with through bolts and have bronze linings. The trolley travel gearing is entirely inclosed in a single rigid unit gear case and no overhung gears are used. Large manholes are provided in the gear covers so that it is not necessary to remove the gear covers to inspect or oil the gearing. The hoisting gear train from the armature to the drum gear is in one rigid casting, and this, it is pointed out, is a point of difference from other trolleys now on the market.

Uniform Oxidizing of Sheets

Oxidizing steel or iron sheets so that they will have a uniform bluish color instead of the varying colors produced by the ordinary processes of annealing is the subject of a patent (U. S. 1,115,281—October 27, 1914) granted to John E. Carnahan and Arthur J. Maskrey, Canton, Ohio. The ordinary sand-sealed annealing box is inclosed in another sand-sealed box which constitutes the main point in the invention. By conducting the annealing in one box inclosed by another it is found that the subsequent separation and oxidation results in a substantially uniform color throughout each sheet and the prevention of an excessively deep scale at or near the edges of the sheets. This is due to the more uniform temperature in the second box and to the fact that the sheets are better protected from the products of combustion.

ANNEALING OVEN FOR TIRES

A New Russian Type of Shaft Furnace Insuring Uniform Results

In the Journal of the Russian Metallurgical Industry, Prof. W. E. Grum-Grzimailo publishes a description of a new annealing furnace for tires designed by him. An abstract of the original article appears in Stahl und Eisen for September 3, 1914, which is substantially as follows:

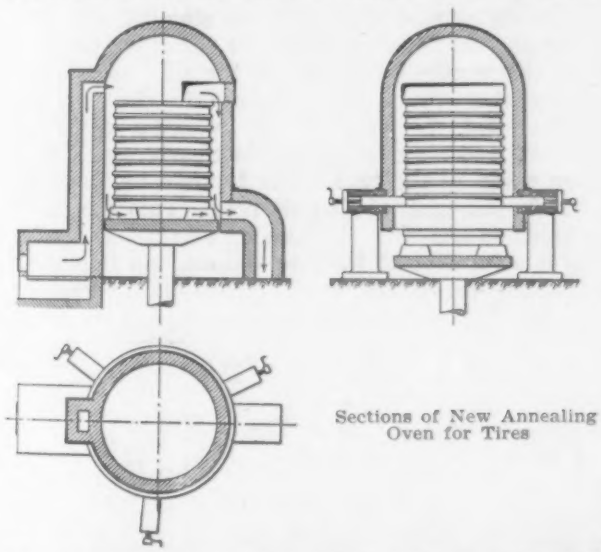
A furnace for annealing tires should meet the following requirements:

1. The heating of each tire should be uniform over the entire surface and transverse sections.

2. It should be possible to bring a number of tires to the desired temperature uniformly and with equal celerity and to maintain the temperature for the same length of time.

3. It should be possible to remove easily and quickly each tire from the furnace at the calculated moment so that one can then carry out any desired heat-treating arrangements.

To meet these conditions the designer built a shaft furnace, having reverse flame direction, in which the tires are arranged in a pile, one on the other, as shown in the illustration. The lowest tire rests upon the floor of a movable platform which closes the lower opening of the shaft or furnace.



Sections of New Annealing Oven for Tires

The heating gases come from a fire-box located just outside the furnace from which they are conducted by a special flue under the dome of the shaft. From here they descend the shaft in an even stream thus playing about the tires on all sides, inside as well as outside. They pass out through an underground flue to the chimney. The upper tire gradually assumes the prescribed temperature which is determined by means of a pyrometer, registering this when desired, while the lower ones are being warmed.

When the upper one is sufficiently heated it is removed through a side opening in the top on the same level. By operating three screws or bolts, which enter just above the top of the movable platform and which are so adjusted as to touch the lower tire just under the flange, the column of tires is supported in its original position as shown by the illustration. By now lowering the platform a new tire is placed on it. It is then correspondingly raised until the supporting screws are relieved and can be withdrawn, whereupon a further elevating to the former hight of the upper tire ensues.

The tire that has been removed can be heat-treated according to any desired method. If a prescribed complete hardening is desired, the required treatment can be accomplished in a second furnace of similar design. If one desires, however, to limit oneself to quickly cooling the tire to just under the critical point and then slowly from that point on, another furnace can be employed which however does not need to be heated. This can, however, be more expeditiously accomplished by means of the latent heat of the tires which can be sent in the reverse direction through the furnace. The tires could be placed therein warm and, instead of the hot gases, cold air could be admitted from below which could be regulated by means of a damper. This air must necessarily become warm and must, since its direction is perpendicular, spread itself evenly over the entire surface of the tires, ascend and thereby cool the tires uniformly, thus affording one the opportunity to prolong the cooling as much as desired.

New Enameling Plant at Chattanooga

Ground was broken December 10 for the first building of the Chattanooga Enameling & Stamping Company's plant at Chattanooga, Tenn. President P. J. Kruesi and Industrial Manager C. W. Howard, of the Chamber of Commerce, which was instrumental in locating the industry, were in attendance. The event was an important and interesting one for the Chamber of Commerce, because the organization, through its industrial bureau, of which C. H. Huston, a prominent manufacturer and officer of the Chattanooga Trust Company, is chairman, had been negotiating for the enameling plant for several months. It was especially satisfactory to bring the matter to a successful issue during the stress of business conditions occasioned by the European war.

William Lipphardt, of Wheeling, W. Va., head of the new concern, is an experienced manufacturer of sheet iron and steel enameled products. After many years of successful business he desired to make a change. His selection of Chattanooga after minute investigation is significant of that city's advantages for manufacturing. The enameling plant means the introduction of an industry not heretofore represented anywhere in the South.

The Chattanooga Enameling & Stamping Company will have a paid-in capital stock of $200,000. It is expected that at least the first building, 100 x 300 ft., will be finished by March 1. The products will include a wide variety of domestic articles, gas stoves, railroad semaphores and enameled parts entering into the manufacture of other and larger goods.

The site of the plant is near the Tennessee River and comprises 28 acres in a section which is expected to be one of the principal industrial districts of Chattanooga. The Lipphardt plant is the initial one to locate there, but it is believed to be but the forerunner of others. The land lies conveniently near the Chattanooga Traction Company's line operating passenger and freight service between the city and Signal Mountain.

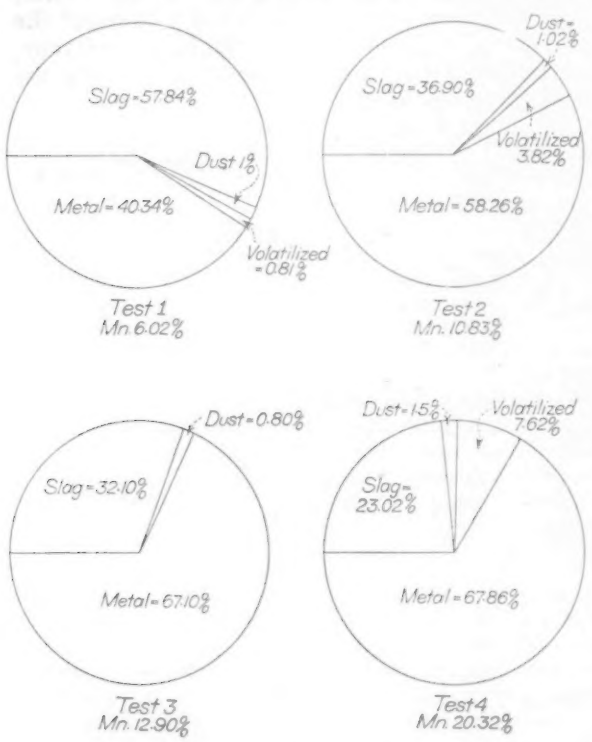
Another element that entered largely into the calculations of Mr. Lipphardt in choosing Chattanooga for his future industrial activities is the existence of plentiful hydroelectric power and, beginning about the time his factory is finished, the production of by-product coke-oven gas. Both kinds of power, electricity and gas (the latter to be sold at fairly competitive prices with natural gas), are necessary for the enameling plant. Mr. Lipphardt and his sons have not only had manufacturing experience in this country but have traveled extensively in Europe, studying enameling methods. They have acquired secret processes which will be put into practice at the Chattanooga plant.

The American Pig Iron Association will hold its annual meeting at the Waldorf-Astoria on Thursday, January 27. The president, Joseph G. Butler, Jr., and the secretary, John A. Penton, will present reports.

Operation of Spiegeleisen Blast Furnaces

German Tests Showing Conditions Influencing Manganese Reduction and Loss for Four Grades of Spiegel

Stahl und Eisen for September 10, 1914, contains a very interesting article giving the results of detailed observations made by Dr. H. Thaler at blast furnaces making spiegeleisen, with increasing manganese up to 20 per cent. Four series of tests were carried out, being on spiegel with 6.02, 10.83, 12.90



Distribution of the Manganese Charged

and 20.32 per cent. respectively, and the results constitute a valuable contribution to the subject of the reduction of manganese in the blast furnace.

The material balance was only made out for iron, manganese, carbon and oxygen. These results, the heat balances and the general results are given in Tables 1 to 3 respectively. The illustration shows in diagram form the distribution of the manganese of the charge. In regard to the heat balances, there is a difference between incoming and outgoing heat of 7.34 to 9.24 per cent. This represents the loss by radiation and cooling water. The amount of heat produced in the blast furnace by the combustion of one unit of carbon decreases with increasing manganese reduction; the average of the four tests gives 3286 calories. The results of metallic output from the charge, stone consumption and slag volume naturally depend altogether on local conditions. In regard to the method of manganese reduction careful calculations were carried out according to Professor Wüst's method, and it was determined that the oxide of manganese is reduced indirectly like the oxide of iron by carbon-monoxide. This is most probably due to the nature of the ore used which was a spathic carbonate composed of mixed crystals of iron and manganese carbonate.

VARIABLES IN MANGANESE REDUCTION

It was determined that the following conditions influence the reduction of the manganese: 1. The top temperature. 2. The composition and amount of the slag. 3. The time required for the charge to work through the furnace. The top temperature under certain conditions serves as a measure of the manganese reduction, and a continuous record is a valuable aid to proper furnace operation.

As to the composition of the slag, a basic slag rich in lime is necessary. The ratio of the oxygen of the silica to that of the lime must amount to 1.7 to 2.0. The percentage of oxygen as manganese oxide varies from 15 to 20 per cent., and in general decreases with increasing basicity of slag and increasing manganese reduction. In opposition to the view formerly held, that the manganese contents of the slag would be higher the higher the grade of spiegel made, it was found that the percentage varied from 9 to 10 per cent. and was rather lower when making the higher than with the lower grades.

A matter of great importance for the manganese reduction is the slag volume. As is well known the reduction of manganese is never complete, a certain part being carried away with the slag, this amount in the slag varying from 9 to 10 per cent., judging from the results obtained. If the slag volume increases then the manganese loss in the slag increases, and the necessity of working with the smallest possible slag volume is clearly seen. The value given in the text books for loss by slagging off is 30 per cent. of that charged. This should be modified to say that the loss of manganese in the slag is a function of the slag volume, and falls with increasing manganese in the metal and decreasing

Table 1. Heat Balances of the Four Tests

		Test 1		Test 2		Test 3		Test 4	
		1000 calories	Per cent. of the incoming	1000 calories	Per cent. of the incoming	1000 calories	Per cent. of the incoming	1000 calories	Per cent. of the incoming
Incoming	Charge	6	0.2	3	0.1	5	0.13	13	0.3
	Blast	788	22.3	851	23.4	949	25.3	1,183	27.2
	Carbon combustion	2,745	77.6	2,778	76.5	2,794	74.5	3,147	72.5
	Total	3,540	100.1	3,632	100.0	3,748	100.0	4,343	100.0
Outgoing	Reduction of Fe_2O_4	.....	.....	23	0.6	44	1.2	18	0.4
	Reduction of Fe_2O_3	1,237	34.9	1,022	28.1	959	25.6	882	20.3
	Reduction of FeO	285	8.0	339	9.3	372	9.9	250	5.8
	Reduction of the Mn. oxides	126	3.5	235	6.5	270	7.2	492	11.3
	Reduction of SiO_2	72	2.0	89	2.5	128	3.4	153	3.5
	Reduction of CuO	1	0.0	1	0.0	1	0.0	.....	0.0
	Reduction of P_2O_5	3	0.1	3	0.0	3	0.1	6	0.1
	Reduction of H_2O	146	4.1	117	3.2	182	4.9	326	7.5
	Carried away with sulphur	39	1.1	57	1.6	57	1.5	47	1.1
	Carried away with gas	280	7.9	358	9.8	425	11.3	764	17.6
	Carried away with pig iron	277	7.8	277	7.6	277	7.4	288	6.4
	Carried away with slag	325	9.2	328	9.0	308	8.2	320	7.4
	Carried away with dust	1	0.0	1	0.0	1	0.0	33	0.8
	Carried away with water evaporation	190	5.4	161	4.5	159	4.2	150	3.4
	Carried away with CO_2 expulsion	277	7.8	284	7.8	284	7.6	254	5.8
	Total	3,259	92.1	3,296	90.8	3,472	92.6	3,983	91.7
Comparison	Incoming	3,540	100.0	3,632	100.0	3,748	100.0	4,343	100.0
	Outgoing	3,259	92.1	3,296	90.8	3,472	92.6	3,983	91.7
	Excess incoming	281	7.9	336	9.2	276	7.4	360	8.3

slag volume. The results in the four tests were 57.84, 36.90, 32.10 and 23.10 per cent., while the respective slag volumes were 800.6, 746.5, 699.8 and 733.9 kg. per metric ton.

SLAG VOLUME AND REDUCTION OF SILICA

The second condition forcing the smallest pos-

sible slag volume is that if the slag volume is large, so that the concentration of silica is very great, then the reduction of silicon together with the other metals cannot be avoided. This will make the resultant spiegeleisen non-usable. On the same basis the reduction of manganese cannot be carried beyond a certain point, because the concentration conditions are displaced to favor reduction of silicon. If this is worked against by increasing the lime additions the slag becomes too viscous and gives operating troubles. An exact limit where silicon reduction takes place in large amount cannot be given, but the tests show that a conclusion can be reached regarding the silicon reduction from the quotient $\frac{Mn}{Si}$ of the charge. This quotient should be:

With No. 1 spiegel, 6 to 8 per cent., not less than 0.8.
With No. 2 spiegel, 10 to 12 per cent., not less than 1.5.
With No. 3 spiegel, 12 to 14 per cent., not less than 2.0.
With No. 4 spiegel, 18 to 22 per cent., not less than 2.5.

It is also found that the manganese contents of the charge must be about the following:

With No. 1 spiegel, about 5 per cent. manganese.
With No. 2 spiegel, about 8 per cent. manganese.
With No. 3 spiegel, about 9 per cent. manganese.
With No. 4 spiegel, about 12 to 14 per cent. manganese.

In regard to the influence exerted by the time required to work through the furnace it is evident that a long time will favorably influence the coke consumption. The charge will enter the melting zone in a better prepared condition, and more than anything else the indirect reduction by means of

Table 2. Material Balances

	Test	Incoming	Outgoing										Difference	
			Spiegel		Slag		Dust		Volatilized		Total			
		Kg.	Kg.	Per cent	Kg.	Per cent	Kg.	Per cent	Kg.	Per cent	Kg.	Per cent	Kg.	Per cent
Manganese	1	149	60	40.3	86	57.8	1	1.0	1	0.8	149	100	.....	.....
	2	186	108	58.3	69	36.9	2	1.0	7	3.8	186	100	.....	.....
	3	192	129	67.1	62	32.1	2	0.8	.....	.....	193	100	+1	+ 0.5
	4	299	203	67.9	69	23.0	4	1.5	22	7.6	299	100	.....	.....
Iron	1	916	886	96.6	9	1.0	7	0.8	.....	.....	902	98.4	− 14	− 1.6
	2	847	829	97.9	5	0.6	9	1.0	.....	.....	843	99.5	− 3	− 0.4
	3	847	801	94.6	3	0.4	9	1.0	.....	.....	813	96.0	− 33	− 4.0
	4	730	714	97.8	3	0.4	20	2.8	.....	.....	738	101.0	+ 7	+ 1.0
Carbon	1	915	41	4.5	873	95.3	.....	.....	.....	.....	916	100	.....	.....
	2	1,005	48	4.8	954	95.0	.....	.....	.....	.....	1,005	100	.....	.....
	3	1,052	50	4.7	995	94.6	.....	.....	.....	.....	1,047	99.6	−4.3	−0.4
	4	1,218	60	4.9	1,157	95.0	.....	.....	.....	.....	1,219	100	.....	.....
Oxygen	1	1,694	.....	.....	.....	.....	.....	.....	.....	.....	1,510	.....	−184	−10.9
	2	1,732	.....	.....	.....	.....	.....	.....	.....	.....	1,605	.....	−127	− 7.3
	3	1,905	.....	.....	.....	.....	.....	.....	.....	.....	1,630	.....	−275	−14.4
	4	2,102	.....	.....	.....	.....	.....	.....	.....	.....	1,786	.....	−345	−15.0

carbon-monoxide will be more thorough. As a measure for the time required to work through the furnace, the cubic contents necessary to give 1 metric ton in 24 hr. was chosen. This varied with the best results from 3.3 to 4.0 cubic meters, increasing according to the grade of spiegel made, being highest with the high grade.

The loss of manganese through volatilization increases with increasing manganese reduction, being 0.81 per cent. with the 6 to 8 spiegel and 7.62 per cent. with the 18 to 22 spiegel. In starting a furnace on spiegel, light manganese ore charges are first given, and the limestone flux held about 2 per cent. higher than the calculated amount. When the whole furnace is warmer, as shown by increase in the top temperature, the ore burden is increased and the flux lowered. In the same way the change is made slowly to low manganese iron to use up the manganese in the furnace, and also to bring about changes without operating troubles.

SUMMARY OF RESULTS

The results of four tests at blast furnaces

Table 3. Detailed Operating Results per Metric Ton

Determined by:—		Test 1	Test 2	Test 3	Test 4
Measurement	Coke consumption, wet....Kg.	1,010.2	1,112.7	1,162.5	1,357.0
	Coke consumption, dry....Kg.	912.0	1,004.5	1,054.7	1,279.0
	Carbon consumed....Kg.	801.6	882.9	927.1	1,116.0
	Slag produced....Kg.	800.6	746.5	699.8	733.9
	Dust produced....Kg.	20.4	23.9	23.2	49.4
	Gas produced....Cu.m.	4,278.8	4,555.7	4,741.0	5,812.0
	Blast....Cu.m.	3,170.1	3,330.2	3,448.2	4,395.0
	Furnace contents, each ton produced daily....Cu.m.	3.29	3.88	3.78	3.99
Calculation	Gas for 1 kg. coke....Cu.m.	4.68	4.53	4.49	4.54
	Gas for 1 kg. carbon....Cu.m.	5.33	5.15	5.11	5.20
	1 cubic meter gas contains carbon....Kg.	0.20429	0.20955	0.20987	0.19921
	1 kg. carbon, heat produced from, in calories....3,616.4	3,337.4	3,210.2	2,981.9	
	Blast for 1 kg. coke....Cu.m.	3.47	3.31	3.26	3.43
	Blast for 1 kg. carbon....Cu.m.	3.95	3.77	3.71	3.93
	Loss of blast....Per cent	11.4	7.2	16.7	14.1
	Output from the ore....Per cent	44.14	47.37	46.63	48.58
	Output from the charge....Per cent	36.94	39.31	39.95	40.60
	Lime addition....Per cent	19.49	17.01	19.39	19.65
	Heat contents, each ton produced daily, calories	.....	277.	.....	288.
	Heat contents of the slag daily, calories.	.....	440.	.....	436.

making spiegeleisen of four different percentages of manganese can be given as follows:

The reduction of manganese can take place indirectly as well as directly.

The fuel consumption increases with increasing manganese reduction.

The percentage of metallic manganese reduced from the charge increases with increasing manganese contents in the metal and the purity of the ore.

High furnace temperatures and therefore high top temperatures favor manganese reduction.

The manganese contents of the slag is 8 to 10 per cent., and with normal working is a function of the slag volume.

The ratio of manganese to silicon in the charge must under no conditions go below nor above certain limits.

Slow driving favors manganese reduction, and the fuel consumption is lowered.

The manganese loss through volatilization is low with low-grade spiegel, but rises quickly with increasing manganese reduction, and for 20 per cent. spiegel is 7 to 8 per cent.

The loss of manganese with the flue dust remains fairly constant at about 1 per cent. G. B. W.

The entire eleventh floor of the new 16-story First National Bank Building at Milwaukee, Wis., has been leased by a number of concerns prominent in the iron-ore, fuel, furnace, and allied industries. After January 1 the floor will be occupied by the following corporations: Northwestern Iron Company, Milwaukee Coke & Gas Company, Milwaukee Solvay Coke Company, Northwestern Light & Power Company, Northwestern Lime, Stone & Slag Company, Northwestern Milling Company, Harvest Farms Company, Newport Mining Company, Dunn Iron Mining Company, Harrow Spring Company, Newport Turpentine & Rosin Company, Elkhorn Gas Coal Company and Gogebic Steel Company.

The American Malleable Iron Works, Marion, Ohio, entertained a large party of local business men at luncheon December 5, in celebration of the completion of extensive additions to its plant, including an office building and three factory buildings. The capacity has been largely increased.

ESTABLISHED 1855

THE IRON AGE

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Legislation Versus Efficiency

Louis D. Brandeis, whose latest function has been that of counsel for the Interstate Commerce Commission's opposition to a freight rate advance by the Eastern railroads, has made many unfair statements concerning railroad and steel trade conditions. But he never said a truer thing than when he used these words in reference to the most important fact in the industrial situation in this country: "The demands for shorter working time, for higher earnings and for better conditions cannot conceivably be met unless the productivity of man is increased."

All the investigation, agitation and legislation of the past two years—and in that time the country has had an unprecedented amount of all three bearing on industrial problems—cannot avoid this alternative: "unless the productivity of man is increased." There is no other way. The high cost of living and the unrest of which it was a prime cause were the starting point of the Commission on Industrial Relations, which has just presented its preliminary report to Congress. High cost of living has been the major premise of an untold number of arguments in print, on the platform and in Congress, for changes in the existing order. It was the chief reason given for the extra session of Congress in the spring of 1913. For was not every day precious when the country was waiting for a tariff which should take the burden of high prices from the backs of a groaning people?

Looking at this first report of the Industrial Commission, summing up the testimony of 514 witnesses, we find that there is really nothing new in it at all. It traverses the same circuit of unjust distribution of the products of industry, rapid rise of prices, insufficient wages, and labor's protest against injustice and oppression that has been the result of such inquiries heretofore. From scores of representatives of labor have come the same demand for shorter working time, higher earnings and better conditions, but none of them regarded higher efficiency, which is only another way of putting Mr. Brandeis's "increased productivity," as the road by which their desires are to be reached.

Mr. Brandeis's verdict only puts in other words the contention of "Manager," who in a telling way marshaled facts in these columns irrefutably proving that the high cost of living is the high cost of labor. The efforts of national legislators in the past two years have been bent to the single purpose of taking something away from one class in the community and giving it to another. They have seemed to believe that if they could reduce the profits of manufacturers there would be so much available for distribution among wage earners. Workmen have done their share to cut down manufacturing profits, acting on the belief that if they did less work for their employer they would have a larger proportion of the joint product of employer and employee. But it has all come back to one thing: the high pay and low efficiency of workmen in many lines have increased the cost of what they produced and made it more expensive for every man who consumed it. No legislative cure will ever be found for the conditions so produced that does not provide a way for increasing the output of the man. But the legislators and the labor unions have no idea of doing that.

October Export Figures Interesting

October was the third month of the European war, and the detailed statement of our exports in that month, just issued at Washington, makes a very interesting showing indeed. Almost throughout the iron and steel list the figures seem to speak, telling that many nations have laid down the vocations of peace and taken up arms.

To make a valid comparison of October conditions with those obtaining just before the war, the proper month must be selected. For months our exports of the tonnage products of the iron and steel industry proper as well as our exports of machinery, hardware, etc., had been running much lighter than in the banner years of 1912 and 1913, hence no comparison with those years would reflect war conditions and nothing else. As to the seven months of 1914 preceding the war, January and February were light months, followed by a sharp increase, then a slight decrease in June and quite a large decrease in July. Had no war started, July might have proved an exceptionally light month, and therefore not representative. We find that in June the total weight of all the tonnage lines exported was within 3 per cent. of the monthly average during the preceding five months, while the total value of the tonnage and the non-tonnage items (machinery, hardware, etc.) was within 1 per cent. of the preceding five months' average; hence June is an entirely fair month to compare with October. The figures make the following general comparison:

Iron and Steel Exports

	June	October
Tonnage items, gross tons...	144,000	147,000
Tonnage items, value.....	$5,756,000	$6,299,000
Non-tonnage items, value...	$13,172,000	$10,157,000
Total value	$18,928,000	$16,456,000

The weight of the tonnage exports was greater in October than in June, showing a large increase over July, August or September, and the value was also greater than in June. In weight these exports were the largest since April.

The total exports of machinery, hardware, cutlery, etc., were 23 per cent. less in October than in June, and by reason of this decrease the total value of all iron and steel showed a decrease from June to October, and indeed October fell a trifle below July in this respect, when the tonnage value alone showed a considerable excess.

Comparing the 144,000 tons of tonnage products exported in June with the 147,000 tons in October, one finds decreases in pig iron, scrap, wire rods, steel bars, black sheets, galvanized sheets, structural steel and tin plates. In most of these decreases there is simply reflected a general decrease in ordinary trade activity. In some of the items there has been increased demand from belligerents, particularly England, through the stoppage of German supplies, but not sufficient to overbalance the slowing down in trade generally. Much has been made for three or four months past of wire rod demand from England, but the fact is that wire rods exports in June were 11,929 tons, while the exports in the four months following have run 347 tons, 855 tons, 1913 tons and 5716 tons respectively.

Some of the increases in exports are quite significant. October exports of horseshoes were 23 times as great as those in June, the increases being from 39 tons to 905 tons. Barb wire increased 125 per cent. Both these increases represent in large part a demand for war purposes. There was an increase in rails from 13,161 tons to 22,057 tons, attributable, it may be presumed, to the failure of Belgian and German mills to fill their usual trade.

A comparison of exports of manufactured steel, the non-tonnage items, in June and October respectively, is still more indicative that a great war is in progress. Builders' hardware, cutlery and enameled ware all decreased slightly, while firearms increased from $214,000 to $692,000.

A great curtailment of the practice of the arts of peace is indicated by decreases of $121,000 to $32,000 in adding machinery, $424,000 to $90,000 in cash registers, $186,000 to $78,000 in elevators and $113,000 to $3000 in electric locomotives.

When we observe that wood working machinery decreased from $213,000 to $44,000, while metal working machinery increased from $1,080,000 to $2,110,000 we cannot doubt that the metal working machinery purchased is very largely for the manufacture of munitions of war.

It has been claimed of some wars that they were fought largely with the typewriter and printing press, but such is not the case with this war, for typewriters dropped from $806,000 to $241,000, typesetting machinery from $147,000 to $32,000 and printing presses from $206,000 to $80,000.

Under miscellaneous tools four items are listed—axes, hammers and hatchets, saws, and shovels and spades. Each of the first three items showed a moderate decrease while the fourth showed a doubling in exports, from $17,000 to $35,000.

Automobiles are listed separately from iron and steel manufacturers, and the export figures are loud in their disclosure:

Value of Automobiles Exported

	June	October
Commercial	$120,257	$2,286,964
Passenger	1,870,882	678,387
	$1,991,139	$2,965,351

Lest the divergence might be attributed in part to the season, it may be mentioned that the exports in June, 1914, were not substantially different from those in October, 1913. From June to October the commercial vehicles increased nineteen-fold, while the passenger vehicles decreased by almost two-thirds.

Export data for iron and steel and machinery are now available for a period covering the first three months of the war, and they show conclusively that there is a progressive increase, whereby the tonnage lines even in October reached a slightly higher level than obtained just before the war, while the exports of iron and steel manufactures have been rapidly regaining the ground lost and may very shortly be back to their old rate, as a total, but with such a redistribution that some branches of manufacture may not regain their former volume of trade for a long time, while others will show a greatly increased demand.

Commerce Commission Reorganization

The exasperating slowness of the Interstate Commerce Commission is attracting the attention of other than mere business men. Washington advices state that as a perfectly logical result of the demonstrated inability of the commission to deal promptly with issues of great importance to the country, such as the 5 per cent. rate advance case, a movement has been launched for its comprehensive reorganization. Several entirely distinct influences are behind this movement and it is highly significant that the strongest champions of the commission, as a necessary Federal organization exercising judicial powers, are among the leaders.

A variety of amendments to the interstate commerce act are being formulated and will be brought to the attention of the interstate commerce committees of the two houses. Senator Newlands, of Nevada, chairman of the Senate committee, is at work on a comprehensive plan under which the commission will be increased from seven to nine members and divided into several sub-commissions, each charged with certain jurisdiction and functions. It is his idea that the commission now wastes much time by sitting *en banc* in a large number of cases, thus confining its entire membership to the hearing room for days and weeks, when the issues presented might well be heard and determined by three members. Another disadvantage that follows such hearings is the difficulty of harmonizing the divergent views of seven men who sit rather as jurors than as judges, but who, unlike jurors, cannot be discharged after a reasonable, but unsuccessful, attempt to agree, but must argue with each other indefinitely until, hope of a unanimous verdict being abandoned, a decision is reached by a divided court. These conditions are aggravated by the disposition of the commission, which is growing more and more apparent, to compromise its decisions in order that they may be concurred in by all the members, the result being that neither shippers nor carriers are satisfied with the outcome. In nearly every such case applications for

rehearings are made or supplemental petitions are filed, and the volume of litigation, after such compromise verdicts, often far exceeds that of the original cases. It is stated, and apparently by high authority, that President Wilson is seriously considering a recommendation to Congress for the amendment of the interstate commerce act to meet existing conditions. What form this recommendation will take is not disclosed, but it is believed that the President's position in the matter will be publicly defined before the end of the present session.

Not the slightest possibility seems to exist that the attempt to regulate railroads by commission will be abandoned. Efforts will be made to get the commission itself into such shape that action will be had in a reasonable time after application for relief by either shipper or railroad. This should be accomplished at the present session of Congress. It would be well also if some plan could be adopted whereby the national body would have exclusive jurisdiction, regardless of State lines and State authorities.

CORRESPONDENCE

Lower Tariff Hurtful to the Manufacture of Small Chains

To the Editor: Eliminating the effect of the war and the general business depression, the effect of the new tariff on the chain industry has been even more disastrous than was predicted in the representations made at the committee hearings at Washington two years ago. The reduction of 44 per cent. in the tariff, or from 45 per cent. to 25 per cent. ad valorem, took effect immediately and transferred to foreign makers (principally English) 90 per cent. of the bicycle chain business. This at once took from our payroll 150 employees, and our present small demand is confined to the trade that insists on a "Made in the United States" chain of superior quality.

The analysis of this situation is as follows: Even though we are operating under the Emerson system of efficiency at 98 per cent. efficient and our plant is modern and up-to-date, with the latest machinery and automatic tools, and our costs according to a United States standard are extremely low, still we are not able to produce a low grade product that will allow us to compete with a similar product made in England.

A visit to the important English plants discloses the fact that they are quite as well equipped with special automatic machinery as are the American plants, and further their average payroll per person is 50 per cent. less than our own payroll. Being on a free trade basis their investment in plant account is materially lower than in the United States, making their investment on which earnings must be made very much less than our own. The final result is that the cost of English manufacture is almost 50 per cent. less than in a similar domestic plant.

Cost of material—cold rolled flat steel, screw stock and wire—is only slightly less than of that which we buy. The great difference is in the cost of labor and investment burden and overhead—salesmen, selling expense, etc. This is proved by the fact that on small chains such as are used for bicycles, the labor cost is 65 per cent. and the material cost 35 per cent. of the total factory cost. On this product they are able to and do sell bicycle chains with profit at a price, freight and duty paid, delivered in New York, 30 per cent. less than our costs. On the other hand, on certain large chains in which the labor cost is 35 per cent. and the material 65 per cent. of the total cost, we in the States sell at a lower price here than they sell to their own trade at home.

It has been said that under a high tariff the public pays the duty. Granted that this is true, it is a fact that under a reduction of the tariff on our product the public pays the high duty just the same. In the case of bicycle chains the difference in the price at which we can sell a bicycle chain and the price at which the foreign chains are sold amounts to 10c. to 15c. per bicycle. This difference in price is absorbed by the manufacturers of the bicycles or the jobber, and the individual purchaser of the bicycle pays the same price as of old, at the same time securing usually an inferior article. The result has been that the profit has been transferred to the manufacturer of bicycles or the middleman here and to the maker abroad.

Our business now being confined to the larger chains and a restricted business on the smaller chains of quality, we are obliged to bide our time until a more equitable tariff can be secured and in the meantime join in the nation-wide campaign having for its slogan, "Buy a Product Made in the United States of America." In case every American-made bicycle were equipped with an American-made chain, employment would now be furnished for 600 additional employees and the public would be using a chain with longer life at no additional expense.

We are strongly in favor of a scientifically made protective tariff law and give our preference to a product made in the United States of America.

L. W. WAINWRIGHT,
President Diamond Chain & Mfg. Company.

Indianapolis, Ind., December 1, 1914.

[In view of his testimony at Washington when the Underwood tariff bill was under consideration two years ago, Mr. Wainwright was asked by *The Iron Age* for a statement as to the effect of the reduced tariff on the chain industry.—EDITOR.]

Power Consumption of Electric Furnaces

To the Editor: I have read with much interest Mr. Snyder's discussion of my paper, printed in *The Iron Age* of October 1, 1914. The kilovolt-ampere-hour unit is used in several places in Canada, and is the only unit that should be used for large power consumption, when a low rate is desired.

When it comes to a question of high and low power-factor furnaces, Mr. Snyder is quite right when he says the low power-factor furnace is the more economical from the foundrymen's standpoint, provided he is protected by a suitable contract with the power company. However, if no contract exists he is taking great risks with a low power-factor installation. The tendency at the present time is to consolidate small generating plants and operate from one central station. This allows electric power to be produced cheaper and will aid the electric furnace industry for that reason. It is obvious that a low power-factor furnace would raise havoc with other customers on the same line. Special machinery would have to be installed to maintain a normal power factor. This is another reason why a contract would be the only safeguard to the foundryman using the low power-factor furnace, in order that he may be assured of economical power.

Attention is also called to the power consumption of the low power-factor furnace, which Mr. Snyder gives as 600 to 700 kwhr. This consumption is very little less than that of a three-phase furnace operating as a melting furnace only. The smaller furnaces (three-phase) of 1 ton capacity will melt steel hot enough to pour, low in carbon, with a power consumption of 700 to 850 kwhr. Those acquainted with the power factors of the two furnaces will see at a glance that the low power-factor furnace requires about 25 to 30 per cent. more power (electrical horsepower) at the station than does the high power-factor furnace. When power is paid for on the kwhr. basis, the low power-factor furnace does not pay for the power in the same ratio as the high power-factor furnace, and the power company is clearly the loser.

Here is the point I wish to bring out: there is a certain amount of heat required to melt and bring steel to the tapping temperature; and it makes no difference what kind of a furnace is used, there must be a certain

number of kv-a-hr. used for the melting of the steel plus the kv-a-hr. to make up for the heat losses, induction losses, etc. Now then if the low power-factor furnace requires so much more power to produce one ton of steel, it is plain to be seen that the furnace losses must be very large; in other words, the efficiency is considerably lower than that of the high power-factor furnace. While at the present time the cost of power per ton of steel in the low power-factor furnace is perhaps 15 per cent. lower than the power cost per ton of steel in the high power-factor furnace, as the schedule of prices is at present made out, an inequality of this power cost, which is bound to exist between the two furnaces, will demand attention sooner or later. Then the power cost per ton of steel of the low power-factor furnace will be 20 to 30 per cent. more than the high power-factor furnace.

The low power-factor furnace requires the so-called flaming arc or long arc in order to obtain its present efficiency and bring about a rapid melt. This necessarily means that the heat is considerably above the molten bath, causing the furnace walls and bath to be of higher temperature than the bath of metal. This causes undue radiation and helps to account for some of the increased heat losses. The three-phase furnace using the three electrodes gives a better distribution of the heat, and operating with a much shorter arc imparts the heat to the molten bath, making a rapid and even melt. The molten bath is also hotter than the upper interior of the furnace. In all metallurgical furnaces if the heat can be put into the bath, rather than heat the bath by the deflected heat from the side walls and arch, the refractory cost will be much lower.

While the electrode consumption is given as 3 to 4 lb. per ton of steel produced, is the oxidation of the electrode during the cooling down of the furnace included? It would be interesting to know the average power factor of the Snyder furnace operating with current at 60 cycles and with current at 25 cycles.

W. L. MORRISON.

International Engineering Congress, 1915

Some confusion seems to have arisen in the minds of some engineers in this country between the International Electrical Congress, which it was proposed to hold in San Francisco in September, 1915, and the International Engineering Congress, which is to be held from the twentieth to the twenty-fifth of the same month. Owing to the impossibility of convening the International Electrotechnical Commission it was decided by the governing body of the American Institute of Electrical Engineers to postpone the holding of the Electrical Congress indefinitely.

The committee of management of the Engineering Congress wishes to impress upon all engineers of the country its earnest desire for the support of the whole engineering fraternity, and feels that the volumes which will be received by those who subscribe to the congress will be a very adequate return for the subscription fee. It has its general offices in the Foxcroft Building, San Francisco.

Less Decrease in Steel Corporation Orders

The United States Steel Corporation's statement of unfilled orders on its books November 30 shows a total of 3,324,592 tons as compared with 3,461,097 tons on October 31. This is a decrease of 136,505 tons, which is not so large as that of October—326,570 tons. On November 30, 1913, unfilled orders totaled 4,396,347 tons. Mill operations in November were at a lower rate than in October. The following is a statement of unfilled tonnage for each month beginning with the high point of December 31, 1912:

November 30, 1914	3,324,592	November 30, 1913	4,396,347
October 31, 1914	3,461,097	October 31, 1913	4,513,767
September 30, 1914	3,787,667	September 30, 1913	5,003,785
August 31, 1914	4,213,331	August 31, 1913	5,223,468
July 31, 1914	4,158,589	July 31, 1913	5,399,356
June 30, 1914	4,032,857	June 30, 1913	5,807,317
May 31, 1914	3,998,160	May 31, 1913	6,324,322
April 30, 1914	4,277,068	April 30, 1913	6,978,762
March 31, 1914	4,653,825	March 31, 1913	7,468,956
February 28, 1914	5,026,440	February 28, 1913	7,656,714
January 31, 1914	4,613,680	January 31, 1913	7,827,368
December 31, 1913	4,282,108	December 31, 1912	7,932,164

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Mesta Company to Build Stumpf Engines

The Mesta Machine Company, Pittsburgh, Pa., has acquired the rights from the Stumpf Una-Flow Engine Company, Syracuse, N. Y., to build the Stumpf Una-Flow type of engine in the United States. The agreement not only gives the Mesta Company the patent rights of Professor Stumpf but includes the use of the knowledge gained by the practical experience, during the past five or six years, of European builders of Stumpf engines. The large number of engines of this type now in operation in Europe give conclusive proof of its excellent standing in regard to simplicity, economy, etc. The Mesta Company is making detailed shop drawings of various sizes of engines for rolling-mill purposes, being confident that this type will take the place of the Corliss valve type used in America for so many years. The company will also build large units for driving electric generators, air compressors, hoisting engines, etc. In European mills many existing engines having the ordinary type of cylinder have been equipped with Una-Flow cylinders, and have been made simpler and more economical. It is expected that similar changes will be made in this country.

The Oaks Club, Remington, Ohio, a Cincinnati suburb, will dedicate its new premises December 19. The club was organized by Cincinnati machine-tool builders, and its officers are as follows: President, N. B. Chace; first vice-president, Percy A. Ware; second vice-president, Edward Kountz; treasurer, O. H. Broxtermann; secretary, F. A. Bowman.

The Iron and Metal Markets

SOMEWHAT BETTER BUYING

Barb Wire Export Demand Still Large

Standard Oil Contracts Pending—British Market Stronger on Government Demand

Buying of finished steel for the first quarter of 1915 has increased somewhat, but it is evident that December will not put on the books the volume of new business needed for a strong revival of mill operations after January 1. The last two weeks of the year, from all signs, will take their usual quiet course.

The possibility of wage and salary reductions at the beginning of the year is again having attention since it became known that no stock offerings to employees will be made by the Steel Corporation, and with the expectation that there will be no bonus distribution. Counting against wage reductions are the improvement in financial and security markets and the better railroad buying looked for after the generally predicted advance in Eastern freight rates. On the other side are the poor balance sheets of the year and the indications that profitable steel prices are some months distant.

The situation still fails to develop the extreme concessions in price which mark the beginning of broad buying movements. Bars and shapes can be had at 1.05c., Pittsburgh, for early delivery, and plates are weaker than either at that price; but 1.10c. holds for first quarter delivery and a good many bar sales have been made on that basis.

Concessions on sheets and tin plates continue. On the latter, while $3.20 was named as the season price, the large contracts closed have been at 10 to 15c. lower. The requirements of the leading can interest will exceed those for 1914 and in that industry 1915 is expected to make a new record. Competition in sheets has been sharper, No. 28 black selling below 1.80c., while galvanized have gone to 2.75c. and in the Chicago district to a basis of 2.70c., Pittsburgh.

A new and urgent inquiry for barb wire for export has sprung up and in one case 12,000 tons is wanted for quick shipment to the war zone. It is doubtful if some of this demand can be met in the time set; yet wire mills are looking for business for the next two or three weeks. Some of them have taken on about all the rod business they will want for four or five months.

The export movement in other lines is rather stronger. Greece has placed 10,000 tons of steel sleepers with two companies. An order for 35,000 steel barrels has just followed one for 25,000 at Cleveland. Russia is expected to place a large order for cars.

Standard Oil Company contracts are being closed including plates and rivets, bolts and nuts. The plate inquiry is for 20,000 tons. In the East 4000 tons of plates will be required in addition to 2000 tons of shapes, for two Standard Oil tank steamers to be built at Newport News, and the Navy Department will buy 2000 tons of plates for fuel oil tanks.

Structural business is more promising, but according to the Bridge Builders' and Structural Society's estimates only 20 per cent. of the country's capacity was contracted for in November, the lowest rate for the year. At Chicago structural steel lettings were 4000 tons, with 7000 tons pending. Cleveland reports 2100 tons placed by automobile works and 2800 tons pending, The B. & O. bridge at Pittsburgh over the Allegheny River, 12,000 tons, will soon come up for bids. At New Orleans bids have been taken on 3200 tons of shapes and 5000 tons of reinforcing bars for cotton warehouse and dock work.

The Pere Marquette has come into the market for 5500 tons of 90-lb. rails. Norway's award of 25,000 tons is to be made December 18. A little car work is coming out, but the year's record will run but little over 80,000, against 147,000 last year.

The pig iron market has quieted down greatly. Pittsburgh reports sales of 15,000 tons of basic and an Ohio river steel works will buy 10,000 tons. In foundry iron buyers are not disposed to pay recent Northern advances. Some Southern producers, however, are still selling at $9.50 to $9.75 for No. 2 iron at Birmingham.

The British market is generally stronger, the stimulus coming largely from government requirements. Heavy inquiries for wire products have gone to London from France. Our cable reports that sheet bars have sold at $25.18 c.i.f., Glasgow, indicating some stiffening on that product.

A permit has been given for shipments of English ferromanganese to Italy. Guarantees are being given so that shipments to this country may be resumed. The stipulations are that none of the metal be re-exported, that no steel into which it enters be shipped to Germany or Austria, and that all shipments of steel to contiguous neutral countries be via London.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous.

	Dec. 16, 1914.	Dec. 9, 1914.	Nov. 18, 1914.	Dec. 17, 1913.
Pig Iron, Per Gross Ton:				
No. 2 X, Philadelphia...	$14.25	$14.25	$14.50	$15.25
No. 2, Valley furnace...	12.75	12.75	12.75	13.50
No. 2 Southern, Cin'ti...	*12.40*	12.65	12.90	13.75
No. 2, Birmingham, Ala..	*9.50*	9.75	10.00	10.50
No. 2, furnace, Chicago*	13.00	13.00	12.50	14.00
Basic, del'd, eastern Pa..	13.50	13.50	14.00	15.00
Basic, Valley furnace....	12.50	12.50	12.50	12.75
Bessemer, Pittsburgh....	14.70	14.70	14.55	15.90
Malleable Bess., Ch'go*.	13.00	13.00	12.75	14.50
Gray forge, Pittsburgh...	13.40	13.40	13.40	13.90
L. S. charcoal, Chicago..	15.75	15.75	15.75	15.25
Billets, etc., Per Gross Ton:				
Bess. billets, Pittsburgh..	19.00	19.00	19.00	20.00
O.-h. billets, Pittsburgh..	19.00	19.00	19.00	20.00
O.-h. sheet bars, P'gh...	**20.00**	19.50	20.00	21.00
Forging billets, base, P'gh.	24.00	24.00	24.00	24.00
O.-h. billets, Phila.....	21.40	21.40	21.40	22.40
Wire rods, Pittsburgh...	25.00	25.00	25.00	25.00
Old Material, Per Gross Ton:				
Iron rails, Chicago.....	11.00	11.00	11.00	13.00
Iron rails, Philadelphia.	13.00	13.00	13.00	15.50
Carwheels, Chicago.....	9.50	9.50	9.50	12.00
Carwheels, Philadelphia..	10.00	10.00	9.50	12.00
Heavy steel scrap, P'gh.	**10.75**	10.50	10.00	11.00
Heavy steel scrap, Phila	**9.50**	9.25	9.25	10.00
Heavy steel scrap, Ch'go	8.25	8.25	7.75	9.00
No. 1 cast, Pittsburgh...	10.50	10.50	10.50	12.00
No. 1 cast, Philadelphia.	**11.50**	11.00	11.00	12.00
No. 1 cast, Ch'go (net ton)	9.00	9.00	8.50	9.75

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Finished Iron and Steel,	Dec. 16, 1914.	Dec. 9, 1914.	Nov. 18, 1914.	Dec. 17, 1913.
Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Bess. rails, heavy, at mill	1.25	1.25	1.25	1.25
Iron bars, Philadelphia..	1.17	1.17	1.12	1.22½
Iron bars, Pittsburgh....	1.15	1.15	1.15	1.35
Iron bars, Chicago.....	**0.95**	0.90	0.95	1.10
Steel bars, Pittsburgh....	*1.05*	1.10	1.10	1.20
Steel bars, New York....	*1.21*	1.26	1.26	1.36
Tank plates, Pittsburgh.	1.05	1.05	1.05	1.20
Tank plates, New York..	*1.21*	1.26	1.26	1.36
Beams, etc., Pittsburgh..	*1.05*	1.10	1.10	1.25
Beams, etc., New York..	*1.21*	1.26	1.26	1.41
Skelp, grooved steel, P'gh	1.10	1.10	1.10	1.20
Skelp, sheared steel, P'gh	1.15	1.15	1.15	1.30
Steel hoops, Pittsburgh..	*1.20*	1.25	1.25	1.40
Sheets, Nails and Wire,				
Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, P'gh.	*1.80*	1.85	1.85	1.90
Galv. sheets, No. 28, P'gh	*2.75*	2.80	2.85	2.90
Wire nails, Pittsburgh...	1.50	1.50	1.60	1.55
Cut nails, Pittsburgh....	1.55	1.55	1.60	1.55
Fence wire, base, P'gh...	1.30	1.30	1.40	1.35
Barb wire, galv., P'gh....	1.90	1.90	2.00	1.95
Coke, Connellsville,				
Per Net Ton at Oven:				
Furnace coke, prompt...	$1.50	$1.50	$1.50	$1.75
Furnace coke, future....	1.75	1.75	1.75	1.80
Foundry coke, prompt...	1.90	1.90	1.90	2.50
Foundry coke, future....	2.15	2.15	2.15	2.60
Metals,				
Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York..	**13.62½**	13.00	12.00	14.75
Electrolytic copper, N. Y.	**13.37½**	12.75	11.87½	14.37½
Spelter, St. Louis.....	**5.65**	5.50	4.95	5.00
Spelter, New York.....	**5.80**	5.65	5.10	5.15
Lead, St. Louis.....	3.67½	3.67½	3.62½	3.85
Lead, New York.....	3.80	3.80	3.70	4.00
Tin, New York.....	**34.75**	32.50	32.50	37.75
Antimony, Hallett's, N. Y.	*14.00*	15.00	15.00	7.00
Tin plate, 100-lb. box, P'gh	*$3.10*	$3.20	$3.15	$3.40

Finished Iron and Steel f. o. b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11.6c.; Cleveland, 10.5c.; Cincinnati, 15.8c.; Indianapolis, 17.9c.; Chicago, 18.9c.; St. Louis, 23.6c.; Kansas City, 43.6c.; Omaha, 43.6c.; St. Paul, 32.9c.; Denver, 68.6c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific coast, 80c. on plates, structural shapes and sheets No. 11 and heavier; 85c. on sheets Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes. The foregoing rates to the Pacific coast are by rail. The rate via New York and the Panama Canal on plates, shapes, etc., is 46c.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.05c., base, net cash, 30 days. Following are stipulations prescribed by manufacturers with extras:

Rectangular plates, tank steel or conforming to manufacturer's standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per sq. ft., are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼ in. thick on edge, or not less than 11 lb. per sq. ft., to take base price. Plates over 72 in. wide ordered less than 11 lb. per sq. ft. down to the weight of 3-16 in. take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Extras	Cents per lb.
Gauges under ¼ in. to and including 3-16 in	.10
Gauges under 3-16 in. to and including No. 8	.15
Gauges under No. 8 to and including No. 9	.25
Gauges under No. 9 to and including No. 10	.30
Gauges under No. 10 to and including No. 12	.40
Sketches (including straight taper plates), 3 ft. and over	.10
Complete circles 3 ft. in diameter and over	.20
Boiler and flange steel	.10
"A. B. M. A." and ordinary firebox steel	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox steel	.50
Widths over 100 in. up to 110 in., inclusive	.05
Widths over 110 in. up to 115 in., inclusive	.10
Widths over 115 in. up to 120 in., inclusive	.15
Widths over 120 in. up to 125 in., inclusive	.25
Widths over 125 in. up to 130 in., inclusive	.50
Widths over 130 in.	1.00
Cutting to lengths, under 3 ft. to 2 ft. inclusive	.25
Cutting to lengths, under 2 ft. to 1 ft. inclusive	.50
Cutting to lengths, under 1 ft.	1.55

No charge for cutting rectangular plates to lengths 3 ft. and over.

Structural Material.—I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and zees, 3 in. and over, 1.05c. to 1.10c.

Wire Products.—Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days or 2 per cent. discount in 10 days, carload lots to jobbers, annealed, $1.30; galvanized, $1.70. Galvanized barb wire and fence staples to jobbers, $1.90; painted, $1.50. Wire nails to jobbers, $1.50. Woven wire fencing, 73 per cent. off list for carloads; 72 off for 1000-rod lots; 71 off for less than 1000-rod lots.

The following table gives the price to retail merchants on fence wire in less than carloads, with the extras added to the base price:

Plain Wire, per 100 lb.

Nos.	0 to 9	10	11	12&12½	13	14	15	16
Annealed	$1.45	$1.50	$1.55	$1.60	$1.70	$1.80	$1.90	$2.00
Galvanized	1.85	1.90	1.95	2.00	2.10	2.20	2.60	2.70

Wire Rods.—Bessemer, open-hearth and chain rods, $25.

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on steel pipe in effect from November 2, 1914, and iron pipe from June 2, 1913, all full weight:

Butt Weld

Steel: Inches	Black	Galv.	Iron: Inches	Black	Galv.
⅛, ¼ and ⅜	74	53½	⅛ and ¼	66	47
½	78	67½	⅜	65	46
¾ to 3	81	72½	½	69	56
			¾ to 2½	72	61

Lap Weld

2	78	69½	1¼	56	45
2½ to 6	80	71½	1½	67	56
7 to 12	77	66½	2	68	58
13 and 14	63½	..	2½ to 4	70	61
15	61	..	4½ to 6	70	61
			7 to 12	68	55

Reamed and Drifted

1 to 3, butt	79	70½	1 to 1½, butt	70	59
2, lap	76	67½	2, butt	70	59
2½ to 6, lap	78	69½	1¼, lap	54	43
			1½, lap	65	54
			2, lap	66	56
			2½ to 4, lap	68	59

Butt Weld, extra strong, plain ends

⅛, ¼ and ⅜	69	58½	⅜	63	52
½	74	67½	½	67	60
¾ to 1½	78	71½	¾ to 1½	71	62
2 to 3	79	72½	2 and 2½	72	63

Lap Weld, extra strong, plain ends

2	75	66½	1½	65	59
2½ to 4	77	68½	2	66	58
4½ to 6	76	67½	2½ to 4	70	61
7 to 8	69	58½	4½ to 6	69	60
9 to 12	64	53½	7 to 8	63	52
			9 to 12	58	47

Butt Weld, double extra strong, plain ends

½	64	57½	½	57	49
¾ to 1½	67	60½	¾ to 1½	60	52
2 to 2½	69	62½	2 and 2½	62	54

Lap Weld, double extra strong, plain ends

2	65	58½	2	55	49
2½ to 4	67	60½	2½ to 4	60	54
4½ to 6	66	59½	4½ to 6	59	53
7 to 8	59	48½	7 to 8	52	42

To the large jobbing trade an additional 5 per cent. is allowed over the above discounts.

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

Boiler Tubes.—Discounts to jobbers, in carloads, in effect from May 1, 1914, on steel and from January 2, 1914, on iron, are as follows:

Lap Welded Steel		*Standard Charcoal Iron*	
1¾ and 2 in.	62	1½ in.	45
2½ in.	59	1¾ and 2 in.	49
2½ and 2¾ in.	65	2¼ in.	45
3 and 3¼ in.	70	2½ to 2¾ in.	54
3½ and 4½ in.	72	3 and 3¼ in.	57
5 and 6 in.	65	3½ and 4½ in.	60
7 to 13 in.	62	5 and 6 in.	49

Locomotive and steamship special charcoal grades bring higher prices.

2½ in. and smaller, over 18 ft., 10 per cent. net extra.

2¾ in. and larger, over 22 ft., 10 per cent. net extra.

Less than carloads will be sold at the delivered discounts for carloads, lowered by two points for lengths 22 ft. and under to destinations east of the Mississippi River; lengths over 22 ft., and all shipments going west of the Mississippi River must be sold f.o.b. mill at Pittsburgh basing discount, lowered by two points. On standard charcoal iron tubes for desirable orders the above discounts are shaded an extra 5, and occasionally two 5's by some makers.

Sheets.—Makers' prices for mill shipment on sheets of U. S. Standard gauge, in carload and larger lots, on which jobbers charge the usual advance for small lots

from store, as follows, f.o.b. Pittsburgh, terms 30 days net, or 2 per cent. cash discount in 10 days from date of invoice:

Blue Annealed Sheets

	Cents per lb.
Nos. 3 to 8	1.25 to 1.30
Nos. 9 to 10	1.30 to 1.35
Nos. 11 and 12	1.35 to 1.40
Nos. 13 and 14	1.45 to 1.50
Nos. 15 and 16	1.55 to 1.60

Box Annealed Sheets, Cold Rolled

	Cents per lb.
Nos. 10 and 11	1.45 to 1.50
No. 12	1.45 to 1.50
Nos. 13 and 14	1.50 to 1.55
Nos. 15 and 16	1.55 to 1.60
Nos. 17 to 21	1.60 to 1.65
Nos. 22 and 24	1.65 to 1.70
Nos. 25 and 26	1.70 to 1.75
No. 27	1.75 to 1.80
No. 28	1.80 to 1.85
No. 29	1.85 to 1.90
No. 30	1.95 to 2.00

Galvanized Sheets of Black Sheet Gauge

	Cents per lb.
Nos. 10 and 11	1.75 to 1.80
No. 12	1.85 to 1.90
Nos. 13 and 14	1.85 to 1.90
Nos. 15 and 16	2.00 to 2.05
Nos. 17 to 21	2.15 to 2.20
Nos. 22 and 24	2.30 to 2.35
Nos. 25 and 26	2.45 to 2.50
No. 27	2.60 to 2.65
No. 28	2.75 to 2.80
No. 29	2.90 to 2.95
No. 30	3.05 to 3.10

Pittsburgh

PITTSBURGH, PA., December 15, 1914.

Encouraging reports come from sales managers of the leading steel companies as to the amount of new orders being booked. These are mostly for first quarter delivery. The mills will not sell beyond first quarter on the basis of present prices, asking $1 to $2 per ton advance for second quarter. A large amount of tinplate business has been closed for 1915 delivery, but little of it went at $3.20 per base box. The leading can interest has closed for all its needs for next year, the amount being heavier than for this year. The steel mills are firm in their attitude as to prices, and it takes a very desirable order for plates, shapes or bars to bring out the 1.05c. price, and this is done only for prompt shipment. Prices on sheets are slightly lower, due to keen competition between two or three leading mills. Pig iron has been fairly active, some sales of basic having been made, and the coke market has also improved. The scrap market is better and prices are slightly higher.

Pig Iron.—A local open-hearth steel interest has taken 6000 tons of basic and another 8000 to 10,000 tons, both for first half. This iron was sold at about $12.50, Valley furnace, but most of it comes from outside furnaces that have lower rates of freight. The Valley furnaces are firm at $12.50 on basic, two leading interests refusing absolutely to shade that figure, and have passed business up that would have netted only 10c. less. There have also been further sales of foundry iron, aggregating 6000 to 8000 tons, mostly for first quarter. There is no inquiry for Bessemer, which is firm at $13.75 to $14, Valley furnace, the latter price for small lots. We quote Bessemer iron at $13.75 to $14; basic, $12.50; malleable Bessemer, $12.75; No. 2 foundry, $12.75 to $13; gray forge, $12.50, all at Valley furnace, with a freight of 95c. a ton for delivery in the Cleveland or Pittsburgh district.

Billets and Sheet Bars.—The local interest has fixed $20 as its minimum price on Bessemer and open-hearth sheet bars for delivery through first quarter, and reports having made sales at $20 and as high as $21 for forward delivery was done. The two Youngstown mills name $19, f.o.b. mill, on sheet bars for first quarter, but will not sell into second quarter at that figure. More negotiations are on for sheet bars for first quarter. We quote Bessemer and open-hearth billets at $18.50, and Bessemer and open-hearth sheet bars $19, f.o.b. maker's mill, Youngstown; Bessemer and open-hearth billets, $19, and Bessemer and open-hearth sheet bars, $20 f.o.b. maker's mill, Pittsburgh. Forging billets are quoted at $24 for sizes up to but not including 10 x 10 in., and for carbons up to 0.25, the regular extras being charged for larger sizes and higher carbons. Forging billets running above 0.25 to 0.60 carbon take $1 per ton extra. Axle billets are quoted at $21 to $22.

Ferroalloys.—Little new inquiry is out for ferromanganese, consumers being covered for some time. It is still the opinion that later on, when stocks have been worked up, there may be trouble in getting ferromanganese from the other side, as practically no new shipments have come into this country since the embargo was declared. Dealers are still quoting English 80 per cent. at $68, seaboard, but subject to delay in delivery. For prompt shipment from seaboard stocks $75 to $80 is asked. We quote 50 per cent. ferrosilicon, in lots up to 100 tons, at $73; over 100 tons to 600 tons, $72; over 600 tons, $71, delivered in the Pittsburgh district. On 10 per cent. ferrosilicon the quotation is $19; 11 per cent., $20, and 12 per cent., $21, f.o.b. cars Jackson County, Ohio, or Ashland, Ky., furnace. We quote 20 per cent. spiegeleisen at $25 at furnace. We quote ferrotitanium at 8c. per lb. in carloads; 10c. in 2000-lb. lots and over, and 12½c. in less than 2000-lb. lots.

Steel Rails.—Only small orders for prompt delivery for standard sections are being placed, but it is believed early in the year some of the Eastern trunk lines will send out inquiries for their 1915 requirements. New orders for light rails are fairly active, coming mostly from the lumber interests. In the past week the Carnegie Steel Company received new orders and specifications for close to 2000 tons of light rails. We quote standard section rails, made of Bessemer stock, at 1.25c., and of open-hearth, 1.34c., f.o.b. Pittsburgh. We quote light rails as follows, in carload lots, 8 and 10 lb. sections, 1.275c.; 12 and 14 lb., 1.225c.; 16 and 20 lb., 1.175c.; 25, 30, 35, 40 and 45 lb. sections, 1.125c. Extras over the above prices are as follows:

Bond drilling, one hole	$0.045 per 100 lb.
Bond drilling, two holes	0.090 per 100 lb.
Bond drilling, one hole in flange	0.090 per 100 lb.
Bond drilling, two holes in flange	0.180 per 100 lb.
All 30 ft. and special lengths, down to but not including 12 ft.	0.045 per 100 lb.
Special lengths, 12 ft. and under	0.090 per 100 lb.
Notching	0.025 per 100 lb.

The above prices are for carload lots, the usual differentials being allowed for large lots.

Structural Material.—While inquiry is more active than for some time, large jobs are slow in being closed up. The Jones & Laughlin Steel Company has taken about 500 tons for a new steel building for the Morrow Mfg. Company, Elmira, N. Y. Bids closed on Monday for a cotton warehouse and dock work at New Orleans, requiring about 3200 tons of shapes and about 5000 tons of reinforcing steel bars, and on Saturday for a Government naval warehouse, taking about 1500 tons of shapes and about 400 tons of reinforcing bars. Neither of these orders has yet been placed. It is expected that the Baltimore & Ohio bridge in this city, crossing the Allegheny River, and taking about 12,000 tons, will be placed in the near future. We continue to quote beams and channels up to 15-in. at 1.10c. for delivery in first quarter, but a desirable order for prompt shipment could be placed at 1.05c.

Plates.—The Jones & Laughlin Steel Company has taken some caissons for the Balboa coaling station at the Panama Canal, requiring 200 tons of plates and about 300 tons of girders. No new inquiries for steel cars have come out. The two local steel car interests are operating only from 25 to 30 per cent. Some definite inquiries for steel cars are looked for early in the new year. We quote ¼-in. and heavier plates at 1.05c. to 1.10c., f.o.b. Pittsburgh, prices depending on the order and deliveries.

Sheets.—The new demand is only fairly active, and specifications against contracts are moderate. Competition between two or three leading sheet mills is keen and is having the effect of weakening prices. Bessemer No. 28 black sheets for first quarter delivery are offered as low as 1.80c., and No. 28 galvanized at 2.75c. to 2.80c. This week the American Sheet & Tin Plate Company is operating 43 per cent. of its hot sheet mill capacity, and independent mills are running from 40 to 50 per cent. We quote No. 28 Bessemer black sheets at 1.80c. to 1.85c.; No. 28 galvanized, 2.75c. to 2.80c.; Nos. 9 and 10 blue annealed, 1.30c. to 1.35c.; No. 30 black plate, tin-mill sizes, H. R. & A., 1.95c.; No. 28, 1.90c.; Nos. 27, 26 and 25, 1.85c.; Nos. 22 to 24, 1.80c.; Nos. 17 to 21, 1.75c.; Nos. 15 and 16, 1.70c. The above

prices are for carload lots, f.o.b. at maker's mill, jobbers charging the usual advances for small lots from store.

Wire Rods.—Foreign inquiry for wire rods has quieted down, and domestic demand is also light. One local mill states it has few rods to spare for the market, as it expects its own wire mills will take practically all its rod output the next two or three months. We quote Bessemer, open-hearth and chain rods at $25, f.o.b. Pittsburgh.

Tin Plate.—Makers report that some of the largest consumers have covered their entire needs for 1915, but in a few cases orders placed were restricted to delivery in the first half. The bulk of the business placed so far has been at $3.10 to $3.15 per base box for 14 x 20 coke plates, the official price of $3.20 having been obtained in only a few cases. On a few of the very largest contracts, it is stated that the $3.10 price has been slightly shaded. It is expected that most of the large business for 1915 delivery will be placed before this month is out. On account of the higher prices for pig iron, and the uncertainty as to its price in the future, the usual differentials in price allowed to large consumers have been slightly less than usual, having in no case, it is stated, exceeded 15c. per box. We quote 100 lb. 14 x 20 coke plates at $3.10 to $3.20, and 100 lb. 14 x 20 terne plates at $3.15 per base box, f.o.b. Pittsburgh. The American Sheet & Tin Plate Company has announced its prices on 20 x 28 terne plate for first half delivery as follows:

Base weight	Coating, lb.	Price
100-lb.	8	$6.30
I.C.	8	6.60
I.C.	12	7.85
I.C.	15	8.30
I.C.	20	9.25
I.C.	25	10.00
I.C.	30	11.00
I.C.	35	12.00
I.C.	40	13.00

For each cross 90c. is added to the price for I.C. Extra of $1 for pure palm oil process. Odd sizes are 10c. extra, unless 100 base boxes per item are ordered for shipment in 50-box lots not over 60 days apart.

Shafting.—The new demand continues light and specifications are only fair. We quote cold rolled shafting at 67 per cent. off, delivered in base territory.

Nuts, Bolts and Rivets.—Some fairly large contracts for nuts and bolts for delivery in first quarter and first half have been closed, and at relatively low prices. Rivets are dull, and some makers are not operating to more than 25 per cent. of capacity. We quote structural rivets at 1.45c. and boiler rivets at 1.55c. in carload lots, small lots taking an advance of about 10c. Discounts on nuts and bolts are as follows in lots of 300 lb. or over, delivered within a 20c. freight radius of maker's works:

Coach and lag screws	80 and 5% off
Small carriage bolts, cut threads	80% off
Small carriage bolts, rolled threads	80 and 5% off
Large carriage bolts	75 and 5% off
Small machine bolts, cut threads	80 and 5% off
Small machine bolts, rolled threads	80 and 10% off
Large machine bolts	75 and 10% off
Machine bolts, c.p.c. & t nuts, small	80% off
Machine bolts, c.p.c. & t nuts, large	75 and 5% off
Square h.p. nuts, blank and tapped	$6.30 off list
Hexagon nuts	$7.20 off list
C.P.C. and r sq. nuts, blank and tapped	$6.00 off list
Hexagon nuts, ⅝ in. and larger	$7.20 off list
Hexagon nuts smaller than ½ in.	$7.80 off list
C.P. plain square nuts	$5.50 off list
C.P. plain hexagon nuts	$5.90 off list
Semi-fin. hex. nuts, ½ in. or under	85, 10 & 10% off
Semi-fin. hex. nuts, ⅝ in. and larger	85 & 5% off
Rivets, 7/16 x 6½, smaller & shorter	80, 10 & 5% off
Rivets, tin plated, packages	80, 10 and 5% off
Rivets, metallic tinned, packages	80, 10 and 5% off
Standard cap screws	70, 10 and 10% off
Standard set-screws	75, 10 and 10% off

Skelp.—Little foreign inquiry is coming out, and domestic demand is also light. We quote: Grooved steel skelp, 1.10c. to 1.15c.; sheared steel skelp, 1.15c. to 1.20c.; grooved iron skelp, 1.50c.; sheared iron skelp, 1.50c. to 1.60c., delivered to consumers' mills in the Pittsburgh district.

Hoops and Bands.—Some contracts for bands for first quarter have been placed at 1.10c., and for hoops at 1.25c., f.o.b. Pittsburgh. On desirable orders for prompt shipment bands are being quoted as low as 1.05c., with extras as per the steel bar card, and steel hoops at 1.20c., f.o.b. maker's mill.

Wire Products.—Foreign inquiry for wire products has quieted down, but the domestic demand for plain and barb wire is fairly active. The new demand for wire nails is dull, as this is the off season. Two local makers of wire report they are running their mills to nearly full capacity. We quote: Wire nails, $1.50; plain annealed wire, $1.30; galvanized barb wire and fence staples, $1.90; painted barb wire, $1.55, all f.o.b. Pittsburgh, freight added to point of delivery, terms 30 days net, less 2 per cent. off for cash in 10 days. We quote steel cut nails at $1.55, f.o.b. Pittsburgh, in carload lots. We quote woven wire fencing at 73 per cent. off in carload lots, 72 on 1000-rod lots and 71 on smaller lots, all f.o.b. Pittsburgh.

Iron and Steel Bars.—Some fairly large contracts for steel bars for delivery in first quarter have been placed at 1.10c., and there is more disposition on the part of makers to adhere to this price for first quarter shipment. For delivery in second quarter some mills are quoting steel bars at 1.15c. and as high as 1.20c. On a very desirable order for prompt delivery 1.05c. could be done. New orders for iron bars are dull. We quote steel bars at 1.05c. for prompt shipment, 1.10c. for first quarter and common iron bars, made from part scrap, at 1.15c., f.o.b. Pittsburgh.

Merchant Steel.—The new demand is quiet and specifications are not heavy. It is likely shipments in the last half of this month will show a still further falling off. Prices on small lots for prompt shipment are about as follows: Iron finished tire, ½ x 1½ in., and larger, 1.30c., base; under ½ x 1½ in., 1.45c.; planished tire, 1.50c.; channel tire, ¾ to ⅞ and 1 in., 1.80c. to 1.90c.; 1⅛ in. and larger, 1.90c.; toe calk, 1.90c. to 2c., base; flat sleigh shoe, 1.65c.; concave and convex, 1.70c.; cutter shoe, tapered or bent, 2.20c. to 2.30c.; spring steel, 1.90c. to 2c.; machinery steel, smooth finish, 1.70c. We quote cold-rolled strip steel as follows: Base rates for 1 in. and 1½ in. and wider, under 0.20 carbon, and No. 10 and heavier, hard temper, 3.25c.; soft, 3.50c.; coils, hard, 3.15c.; soft, 3.40c.; freight allowed. The usual differentials apply for lighter sizes.

Wrought Pipe.—In the first half of December the new demand was about as heavy as in the same period in November, but it will likely show a falling off in the last half of the month. The National Tube Company has taken an order for 46 miles of 6, 8 and 10-in. pipe and 1000 ft. of 12-in. for the Gulf Pipe Line. Discounts on iron and steel pipe are quite firm.

Boiler Tubes.—The new demand for locomotive and merchant tubes is only fair and discounts are more or less shaded, depending on the order.

Old Material.—Distinct betterment is observed in the demand for scrap, and prices are slightly higher. A local consumer has paid as high as $11, delivered, for fairly large lots of selected heavy steel scrap. Borings, turnings and bundled sheet scrap are very firm, some dealers asking higher prices. We note a sale of 300 tons of selected heavy steel scrap to a Youngstown consumer at $10.75, delivered; 800 tons for delivery in the same district at $11, delivered, and 1500 to 2000 tons at $11, delivered to a Pittsburgh mill. Most dealers are now quoting heavy steel scrap at $11 and some as high as $11.25, delivered. For delivery to consumers' mills in the Pittsburgh and other consuming districts that take Pittsburgh freights dealers quote about as follows:

Heavy steel melting scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen, Midland and Pittsburgh delivery	$10.75 to $11.00
Compressed side and end sheet scrap	9.00 to 9.25
No. 1 foundry cast	10.50 to 10.75
Bundled sheet scrap, f.o.b. consumers' mills, Pittsburgh district	8.25 to 8.50
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	11.75 to 12.00
No. 1 railroad malleable stock	10.00 to 10.25
Railroad grate bars	9.00 to 9.25
Low phosphorus melting stock	13.00
Iron car axles	18.75 to 19.25
Steel car axles	13.25 to 13.75
Locomotive axles, steel	19.75 to 20.25
No. 1 busheling scrap	9.00 to 9.25
No. 2 busheling scrap	6.00 to 6.25
Machine shop turnings	7.50
Old carwheels	10.75 to 11.00
Cast-iron borings	8.00
*Sheet bar crop ends	10.50 to 10.75
Old iron rails	12.75 to 13.00
No. 1 railroad wrought scrap	10.75 to 11.00
Heavy steel axle turnings	8.25 to 8.50
Heavy breakable cast scrap	10.25 to 10.50

*Shipping point.

Coke.—Several large contracts have been closed. The Youngstown Sheet & Tube Company has bought its requirements for all of 1915, the business having been about equally divided between the Producers Coke Company, Uniontown, Pa., and the J. H. Hillman Sons Company, this city. The price is understood to have been $1.75 per net ton at oven. A Valley furnace interest has contracted for 8000 to 9000 tons per month for first half at $1.75 at oven. A contract for 10,000 to 12,000 tons per month has been closed on a sliding scale basis. The demand for prompt shipment is dull. Foundry coke is quiet, but several large consumers are figuring on their needs for first half. We quote best grades of furnace coke for prompt shipment at $1.50 to $1.60 per net ton at oven, and for delivery through first half of 1915 at $1.65 to $1.75, strictly standard furnace coke readily bringing the higher price. We quote best makes of 72-hr. foundry coke at $1.90 to $2 for prompt shipment, and $2.25 to $2.50 on contracts for first half.

Chicago

CHICAGO, ILL., December 15, 1914.

More evidence of low prices for steel has appeared. It seems probable that these exceptionally low prices are a continuation of the campaign inaugurated a few weeks ago and are just now coming to light rather than an indication of new weaknesses in the market. Referred back to a Pittsburgh basis recent delivered prices made at Chicago and westward compare with the lowest quotations of at least two decades past despite the increased cost of production. But such a comparison is misleading for the reason that no instances have been substantiated where shipments from Pittsburgh to this territory have been made on so low a basis. Specifications for steel booked last week included a number of tonnages of moderate size, but there is no continuity of buying, and market sentiment suggests no expectation of an improved volume of business during the remainder of the month. In Chicago 4000 tons of structural was placed and there is up for figures about 7000 tons of building steel. The sheet market has developed additional weakness and low prices are being quoted for galvanized. There remains in the market some 5000 tons of inquiry for pig iron, but the eagerness of buyers to close has in great measure disappeared. The prospect of further advances in scrap is less assured for the immediate future.

Pig Iron.—The period of buying in this market has now progressed to the point where the furnaces are casting over their sales of the past 20 days and taking account of the activity as largely completed. There remains a scattering of inquiry aggregating probably 5000 tons, but melters, noting that the market has shown no startling advance in price during the buying movement, are more dilatory in closing. The activity which began almost entirely with Northern iron submerged for the time being interest in Southern brands. But while Southern prices are still out of line in this immediate market, as compared with Lake iron quotations, those who always buy some Southern iron are taking their usual proportion, and in consequence the Southern market has been more clearly defined. Prices as low as $9.50, Birmingham, are noted and $9.75 has been common. Interest is now directed toward the possibility of buying by the malleable iron interests that have thus far failed to participate to any extent and to the promptness with which recent buyers will take out the tonnage provided for in the contracts just made. The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer and basic iron, which are f.o.b. furnace and do not include a switching charge averaging 50c. a ton:

Lake Superior charcoal	$15.75 to $16.75
Northern coke foundry, No. 1	13.50 to 14.00
Northern coke foundry, No. 2	13.00 to 13.50
Northern coke foundry, No. 3	12.50 to 13.00
Southern coke, No. 1 f'dry and 1 soft	13.75 to 14.25
Southern coke, No. 2 f'dry and 2 soft	13.50 to 13.75
Malleable Bessemer	13.00 to 13.50
Standard Bessemer	15.50
Basic	12.50 to 13.00
Low phosphorus	20.00 to 20.50
Jackson Co. and Ky. silvery, 6 per cent.	16.90 to 17.40
Jackson Co. and Ky. silvery, 8 per cent.	17.90 to 18.40
Jackson Co. and Ky. sil'vy, 10 per cent.	18.90 to 19.40

Rails and Track Supplies.—The usual quota of miscellaneous inquiries for track fastenings for small lots of standard rails and for light rails can be recorded. Little business other than this materialized. Railroad operating and purchasing departments are probably working within narrower limits now than at any time in the past several years. We quote standard railroad spikes at 1.50c. to 1.60c., base; track bolts with square nuts, 1.90c. to 2.00c., base, all in carload lots, Chicago; tie plates, $23.50 to $25, f.o.b. mill, net ton; standard section Bessemer rails, Chicago, 1.25c., base; openhearth, 1.34c.; light rails, 25 to 45 lb., 1.07c.; 16 to 20 lb., 1.12c.; 12 lb., 1.17c.; 8 lb., 1.22c.; angle bars, 1.50c., Chicago.

Structural Material.—The Keokuk and Hamilton bridge at Keokuk, Iowa, requiring 3120 tons, has been awarded to the Strobel Steel Construction Company, Chicago. The fabricator of the steel has not yet been named. The Decatur Bridge Company will furnish 600 tons for the State hospital at Kankakee and 1134 tons for the Missouri Athletic Association Building, St. Louis, goes to Christopher & Simpson of that city. Other contracts aggregating about 600 tons are reported. Bids are now in on the second section of the Morrison Hotel, Chicago, calling for about 3000 tons and figures are being taken on 4000 tons for the new Kimball Building. It is expected that the drawings for the Lyon & Healy Building will be out for figures in the very near future. Orders for structural shapes from mill have been scattering. On shapes more than any other steel product the influence of the Pittsburgh market continues to prevail in this territory. We quote for Chicago delivery of plain material from mill 1.20c. to 1.25c.

Demand for material out of stock continues rather disappointing, but the jobbers' trade is enlivened somewhat by the making of contracts for mill shipment business. We continue to quote for shapes out of stock 1.75c.

Plates.—Prices quoted on plates indicate more than any others the extent to which conditions have been localized in this market. The past week has brought to light sales on a basis decidedly more extreme than has been quoted openly. Inducements for tonnage for immediate shipment have been made as attractive as possible to the larger buyers, but withal there is but little tonnage coming in. We quote for Chicago delivery of plates from mill 1.189c. to 1.25c.

For plates from store we quote 1.75c., Chicago.

Sheets.—The sheet market appears even more pronouncedly disorganized than at the previous low point earlier in the year. This is particularly true as regards galvanized sheets. On contracts 2.93c., Chicago, can be done readily and for immediate shipment tonnage at least $1 a ton lower is reported. Black sheets appear to be under less pressure, but for blue annealed 1.30c., Pittsburgh, is the prevailing quotation. We quote for Chicago delivery from mill: No. 10 blue annealed, 1.489c.; No. 28 black, 1.989c.; No. 28 galvanized, 2.889c. to 2.939c.

We quote for Chicago delivery from jobbers' stocks as follows, minimum prices applying on bundles of 25 or more: No. 10 blue annealed, 1.95c.; No. 28 black, 2.55c.; No. 28 galvanized, 3.55c.

Bars.—The steel-bar market is monotonously bare of feature. There is an even greater paucity of orders for hard steel bars but a moderate buying of bar iron, and on the strength of the low prices recently quoted considerable inquiry developed. Appearances indicate that the local bar-iron mills have assumed a more rigid attitude and that the transactions at the minimum prices recorded are no longer representative of the mill's eagerness for attractive specifications. These low quotations serve at least to indicate a price at which many leading consumers were willing to take on round tonnages. The showing of strength in the scrap market has also served to bolster up the bar-iron market. We quote for mill shipments as follows: Bar iron, 0.95c. to 1c.; soft steel bars, 1.189c. to 1.25c.; hard steel bars, 1.15c.; shafting in carloads, 65 per cent. off; less than carloads, 60 per cent. off.

We quote store prices for Chicago delivery: Soft steel bars, 1.65c.; bar iron, 1.65c.; reinforcing bars, 1.65c. base, with 5c. extra for twisting in sizes ½ in. and over and usual card extras for smaller sizes; shafting 60 per cent. off.

Rivets and Bolts.—Contracting for first quarter and first half bolts, particularly by the railroads, continues. The demand for rivets is light and prices are wholly nominal. We continue to quote: Carriage bolts up to ⅞ x 6 in., rolled thread, 85; cut thread, 80-20; larger sizes, 80; machine bolts up to ¾ x 4 in., rolled thread, 85-5; cut thread, 85; larger sizes, 80-5; coach screws, 85-10; hot pressed nuts, square head, $6.60 off per cwt.; hexagon, $7.60 off per cwt. Structural rivets, ¾ to 1¼ in., 1.58c., base, Chicago, in carload lots; boiler rivets, 10c., additional.

We quote out of store: Structural rivets, 2.20c.; boiler rivets, 2.30c.; machine bolts up to ¾ x 4 in., 75-15; larger sizes, 70-10-10; carriage bolts up to ⅞ x 6 in.; 75-10; larger sizes, 70-15 off; hot pressed nuts, square head, $6, and hexagon, $6.70 off per cwt.

Wire Products.—Shipments of wire have been moving with marked freedom as compared with other lines of finished iron and steel. It is reported that the tonnage moved in this market the past week compares on a practically even basis with the shipments of the same week a year ago. As an incentive to some of this buying, prices as low as $1.50, Pittsburgh, are understood to have been made on wire nails, but at this time the market is strong rather than otherwise at $1.55. We quote to jobbers as follows: Plain wire, No. 9 and coarser, base, $1.539; wire nails, $1.739; painted barb wire, $1.739; galvanized, $2.139; polished staples, $1.739; galvanized, $2.139; polished staples, $1.739; galvanized, $2.139, all Chicago.

Cast-Iron Pipe.—The pipe business of the past week includes an interesting sale of 500 tons for the plant of a meat packer in Australia. A similar tonnage was awarded at Council Bluffs, Iowa, to the American Cast Iron Pipe Company. The principal inquiry for the current week covers three lots of 2500 tons each of small pipe for the city of Chicago, the lettings to be held on three successive days, December 21, 22 and 23. We quote as follows, per net ton, Chicago: Water pipe, 4 in., $25.50; 6 to 12 in., $23.50; 16 in. and up, $23, with $1 extra for gas pipe.

Old Material.—The scrap market appears to be well supported in the advanced position thus far attained. Buying and selling among the dealers upon which higher prices have been largely predicated have been augmented by enough consumer buying to maintain the tightness with which supplies of scrap available for the market are being held. This disposition is likely to be further enhanced by the buying of heavy melting steel expected to materialize during the coming week. But the further progress of the market is viewed with slightly less assurance by some of those who have been speculating upon a price advance running into dollars per ton. There are some evidences of an overbought market though this condition is still overbalanced by the bullish influences at work. The Michigan Central offers about 1700 tons of scrap and the Union Pacific about 2500 tons. We quote for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Old iron rails	$11.00 to $11.25
Old steel rails, rerolling	9.50 to 10.00
Old steel rails, less than 3 ft	9.50 to 9.75
Old carwheels	9.50 to 10.00
Heavy melting steel scrap	8.25 to 8.75
Frogs, switches and guards, cut apart	8.25 to 8.75
Shoveling steel	8.00 to 8.25
Steel axle turnings	6.50 to 7.00
Per Net Ton	
Iron angles and splice bars	$10.75 to $11.25
Iron arch bars and transoms	11.00 to 11.50
Steel angle bars	7.50 to 7.75
Iron car axles	14.00 to 14.25
Steel car axles	10.50 to 11.00
No. 1 railroad wrought	8.00 to 8.25
No. 2 railroad wrought	7.50 to 7.75
Cut forge	7.50 to 7.75
Steel knuckles and couplers	8.25 to 8.50
Steel springs	9.00 to 9.50
Locomotive tires, smooth	8.50 to 9.00
Machine shop turnings	5.00 to 5.25
Cast borings	4.50 to 4.75
No. 1 busheling	6.75 to 7.25
No. 2 busheling	5.75 to 6.25
No. 1 boilers, cut to sheets and rings	5.00 to 5.50
Boiler punchings	7.75 to 8.00
No. 1 cast scrap	9.00 to 9.25
Stove plate and light cast scrap	8.00 to 8.25
Grate bars	7.50 to 8.00
Railroad malleable	8.00 to 8.25
Agricultural malleable	7.25 to 7.50
Pipes and flues	6.00 to 6.50

Philadelphia

PHILADELPHIA, PA., December 15, 1914.

A continuance of demand for railroad maintenance-of-way steel products has contributed to increase the activity of mills in this territory. An improvement in specifications against rail contracts previously made is one of the helpful factors. For miscellaneous steel products there is a great deal of inquiry for delivery next year and the feeling is that after January 1 considerable buying will develop. Sellers are unwilling to fill their order books with contracts for delivery far ahead at the prices offered, but are booking fair tonnages for the first quarter. The United States Steel Products Company and the Cambria Steel Company have secured a contract for close to 10,000 tons of steel sleepers for export to Greece, and some other good export propositions are under consideration. The sleepers are to be formed of sheet steel. Bars, plates and shapes still drag and business has been done at concessions with all three. Sheets continue dull, though at prevailing quotations consumers are eager to contract. Pig iron is less active. Some grades of old material are moving a little better and their prices show more strength. Advices from abroad indicate a way in which the British embargo on ferromanganese may be raised.

Iron Ore.—Official returns report an arrival of 10,500 tons from Cuba in the week ended December 12. It is pointed out that even if there were a market for iron ore the present scarcity of ocean vessels would make imports from Europe or Africa a difficult matter.

Pig Iron.—The heavier buying of recent days has tapered off, though in the week ended December 12 there were a good many sales of small and moderate-sized quantities, with now and then a good round lot. Most of the buying has been for first quarter delivery, though some prompt deliveries also have been specified. That the melting of iron shows no increase continues to be true. The quotations for eastern Pennsylvania are unchanged at $14.25 to $14.50, Philadelphia, though there are few admissions made that the bottom of the range would be accepted for standard irons. Most sellers declare $14.50, Philadelphia, to be the minimum. Some Lehigh Valley iron has been sold on a basis of $14, furnace, equal to $14.75, Philadelphia. The furnace price of Buffalo iron is asserted to be $13, which, with the freight rate of $2.45, makes the price delivered in this territory $15.45 and takes this iron out of competition here. A Trenton consumer has an inquiry out for 500 tons of 2.25 per cent. silicon iron and 500 tons of 3.25 per cent. silicon iron. Pipe works in this vicinity are expected to make further purchases in the near future. Some of these, in view of the low cost of heavy melting steel scrap, have been contemplating mixing this material with southern iron. There have been no sales of basic since a transaction of a few weeks ago when a local steel mill reduced the stock of iron it had piled. In low phosphorus small sales only have been made, except in the case of 2300 tons of Lebanon low phosphorus, which sold at close to $17.50, furnace. Quotations for standard brands for early delivery in buyers' yards in this district are as follows:

Eastern Penna. No. 2 X foundry	$14.25 to $14.50
Eastern Penna. No. 2 plain	14.00 to 14.25
Virginia No. 2 X foundry	15.25
Virginia No. 2 plain	15.00
Gray forge	13.50 to 13.75
Basic	13.50 to 14.00
Standard low phosphorus	20.00 to 21.00

Ferroalloys.—England has expressed a willingness to raise the embargo on ferromanganese if several conditions are guaranteed by the American purchaser, according to advices received this week. It must be guaranteed, in writing, first, that the ferromanganese received here will not be resold; second, that steel into which the alloy has entered will not be sold to Germany, Austria or Turkey, and, last, that shipments of such steel to neutral countries will be made by way of London. The price quoted, subject to existing conditions, continues $68, seaboard. The Reading-Bayonne Steel Casting Company has bought 1500 tons of 10 to 11 per cent. ferrosilicon to be divided between its plants at Reading and Bayonne. The price quoted for

this grade of material is $19, furnace. The quotation for 50 per cent. ferrosilicon is $71 to $73, Pittsburgh.

Bars.—Some fairly good specifications have been received, but on the whole the market is quiet and no big propositions are out. First quarter business in steel bars has been done at 1.25c., Philadelphia, but the mills are looking for a higher price. In a few instances lower than 1.10c., Pittsburgh, has been done on prompt shipments. The Vang Construction Company, Cumberland, Md., has purchased 600 tons of concrete bars from the Corrugated Bar Company at a price understood to be close to 1.10c., Pittsburgh, for the Chattanooga bridge. Iron bars are unchanged at 1.17c., Philadelphia.

Plates.—Current orders are confined to small miscellaneous lots on which 1.25c., Philadelphia, is obtained for carload lots and 1.30c. for part carloads. One mill is busy for the time being with a small Government order on which there was sharp competition and on which a low price was made. On prompt business 1.20c., Philadelphia, has been accepted, but this price is by no means general. Plate makers are anticipating business sooner or later as a result of the inquiries which shipbuilders now have under consideration. There is a great deal of inquiry looking to contracts on plates, but the makers are unwilling to load up at existing prices.

Structural Material.—New business is very light and prices have been hurt correspondingly, so much so that 1.20c., Philadelphia, can be done easily on plain material. Bids are in on a storehouse for the Navy Department, Washington, which will take about 1200 tons and on a building for the Keystone Plaster Company, Chester, Pa., which will require between 200 and 300 tons.

Sheets.—The demand on local makers is slow and uncertain at about 1.50c., Philadelphia, for No. 10 blue annealed sheets. Inquiries are heavy for delivery in the first half of 1915 and in some cases for the entire year, but makers hesitate to book contracts at the low prices that are offered. On a contract to run any considerable time they hope to get at least 1.60c., Philadelphia.

Billets.—The market is dull and the quotation unchanged at $21.40, Philadelphia. One producer is not making any steel and is using up his accumulated stock of cold billets in the manufacture of his output of finished products. Forging steel is about $4 higher than rolling billets. An inquiry for several thousand tons of billets for export to Scotland is before the trade.

Coke.—The coke market is dull, with foundry coke particularly quiet. Spot furnace coke can be had at $1.65 per net ton at oven, and first quarter at $1.70 to $1.75 and for the year at about $1.80. Prompt foundry is quoted at $2 to $2.25 and contract foundry at $2.35 to $2.50, the latter figures being nominal. While there is some figuring on contracts, business develops slowly. Freight rates from the principal producing districts are as follows: Connellsville, $2.05; Latrobe, $1.85, and Mountain, $1.65.

Old Material.—Sales of heavy melting steel have been made at $9.50 and an offer of $10 has been made for deliveries to cover several months which, however, was not accepted. While business is still light a better demand is noticeable for railroad wrought, turnings and specialties, as well as heavy melting steel. Quotations for delivery in buyers' yards in this district, covering eastern Pennsylvania and taking freight rates from 35c. to $1.35 per gross ton, are as follows:

No. 1 heavy melting steel	$9.50 to $10.00
Old steel rails, rerolling	11.50 to 12.00
Low phosphorus heavy melting steel scrap	13.50 to 14.00
Old steel axles	13.00 to 13.50
Old iron axles	17.50 to 18.00
Old iron rails	13.00 to 14.00
Old carwheels	10.00 to 10.50
No. 1 railroad wrought	11.50 to 12.00
Wrought-iron pipe	9.50 to 10.00
No. 1 forge fire	8.00 to 8.50
Bundled sheets	8.00 to 8.50
No. 2 busheling	7.75 to 8.25
Machine shop turnings	7.75 to 8.00
Cast borings	7.75 to 8.00
No. 1 cast	11.50 to 12.00
Grate bars, railroad	8.00 to 8.50
Stove plate	8.00 to 8.50
Railroad malleable	9.00 to 9.50

Cleveland

CLEVELAND, OHIO, December 15, 1914.

Iron Ore.—Ore firms do not look for the establishment of prices and buying movement for 1915 until well along in the spring. In this respect the situation is practically as it was a year ago. Ore shipments from docks are exceedingly light. We quote prices as follows: Old Range Bessemer, $3.75; Mesaba Bessemer, $3.50; Old Range non-Bessemer, $3.00; Mesaba non-Bessemer, $2.85.

Pig Iron.—The buying movement has largely subsided. Some small lot inquiries are coming out, but the larger consumers appear to be well covered. Some of these who have not yet bought will probably not do so for some time, as they will carry over considerable last half iron. Furnacemen, with a fair volume of business on their books, would regard the situation as more satisfactory if they had the assurance that the iron purchased would be consumed. In view of the fact that purchases are being made by consumers who are not taking the iron they previously contracted for, the speculative character of some of the buying is apparent. There is a fair volume of inquiry for small lots of low phosphorus iron. The market on foundry grades is a trifle firmer in the Mahoning Valley, but the recent minimum quotations have not disappeared, and there is a wide spread of quotations, from $12.75 to $13.50 for No. 2 foundry. Cleveland furnace prices are unchanged. Southern iron is somewhat firmer, several sales in this territory being made at $10, Birmingham, for No. 2, for the first half as compared with the $9.75 price a week ago. However, some Southern iron is still to be had as low as $9.50, Birmingham, for No. 2. We quote delivered Cleveland as follows:

Bessemer	$14.70
Basic	13.45
Northern No. 2 foundry	13.25
Southern No. 2 foundry	$13.75 to 14.00
Gray forge	13.00
Jackson Co. silvery, 8 per cent. silicon	17.62
Standard low phos., Valley furnace	20.00 to 20.25

Coke.—We note the sale of 12,000 tons of furnace coke per month for the first quarter at $1.75 per net ton at oven. Prices range from $1.50 to $1.60 for prompt shipment, and $1.65 to $1.75 for contract. Foundry coke is dull. Best grades are being quoted at $2.35 for the first half and $2.50 for the year.

Finished Iron and Steel.—A fair volume of contracts are being placed for steel bars, plates, structural material and shafting for the first quarter delivery, but current orders and specifications on contracts are light. While the general feeling is fairly optimistic, little improvement in orders is expected until consumers are through with their inventories after the first of the year. For steel bars, plates and structural material, 1.05c. Pittsburgh is the market price for carload lots for prompt shipment, but buyers who accompany orders with specifications are able in some cases to have deliveries extended into the first quarter. Contracts for the first quarter are being taken at 1.10c., Pittsburgh and some second quarter steel bar business has been booked at 1.15c. Unless the demand improves considerably, the feeling is quite general that the mills will be unable to hold to the $1 a ton advance after January 1, as specified in the contracts. In structural lines the Willys-Overland Company, Toledo, has awarded a contract to the Donovan Iron & Steel Company, Toledo, for 1500 tons and to the Toledo Bridge & Crane Company 100 tons for plant additions. Jones & Laughlin Steel Company has taken 500 tons for an addition to the plant of the Morrow Mfg. Company, Elmira, N. Y., a subsidiary of the Willys-Overland Company. About 800 tons of steel bars for reinforcing work not yet placed will be required for the Toledo extension. New structural inquiries include 1000 tons for the Union National Bank Building, 1300 tons for the Division avenue pumping station and 500 tons for a new hotel in Cleveland. There is an inquiry from the Pere Marquette Railroad for 5000 to 6000 tons of rails. A Cleveland maker has taken an order for 35,000 steel barrels for export in addition to an order for 25,000 barrels recently noted. Sheet prices are irregular, quotations being as low as 1.80c. for No. 28 black, 2.80c. for No. 28 galvanized

and 1.35c. for No. 10 blue annealed, at mill, for carload lots for current delivery. Contracts for the first quarter are being taken at an advance of $1 a ton over these prices. Bar iron is in light demand, with a general quotation of 1c. Cleveland for outside shipment. Warehouse prices are 1.80c. for steel bars and 1.90c. for plates and structural material.

Bolts, Nuts and Rivets.—Bolt and nut makers have commenced making contracts at the new prices named below. These prices are about the same as recent nominal quotations for bolts, but slightly lower for nuts. There is considerable inquiry for contracts which are being made with jobbers for the first quarter and with railroads for the first half. Current orders are being taken at from 5 to 10 per cent. lower than the quotations named. There is a fair demand for rivet contracts, but prices are irregular. The quotations are 1.45c., Pittsburgh, for structural and 1.55c. for boiler rivets for the first quarter for carload lots, with $1 a ton lower prices for spot shipment. There is some shading of the above contract prices. Discounts are as follows: Common carriage bolts ⅝ x 6 in., smaller or shorter rolled thread, 80 and 10 and 5 per cent.; cut thread, 80 and 10 per cent.; larger or longer, 75 and 15 per cent.; machine bolts with h. p. nuts, ⅝ x 4 in., smaller or shorter, rolled thread, 80 and 10 and 10 per cent.; cut thread, 80 and 10 and 5 per cent.; larger or longer, 80 per cent.; coach and lag screws, 80 and 5 per cent.; square h. p. nuts, blank or tapped, $6.50 off; hexagon h. p. nuts, blank or tapped, $7.40 off; c. p. c. and t. square nuts, blank or tapped, $6.20 off; hexagon ⅝ in. and larger, $7.50 off; 9/16 in. and smaller, $8 off; semi-finished hexagon nuts, ⅝ and larger 85, 10 and 10 per cent., 9/16 in. and smaller, 85, 10, 10 and 10 per cent.

Old Material.—Business in the scrap trade has again quieted down after the activity in heavy melting steel in Youngstown, where the mills are now well covered for their December and January requirements, having bought a round tonnage at prices ranging from $10.50 to $11. Not much scrap, however, was sold at the latter price, and with the falling off in inquiries, the market is a trifle weaker with a price range of $10.50 to $10.75 for Youngstown delivery. Locally the market is dull and very little material is being shipped on contract. All Cleveland prices are unchanged. We quote f.o.b. Cleveland as follows:

Per Gross Ton

Old steel rails, rerolling	$11.00 to $11.75
Old iron rails	12.00
Steel car axles	11.75 to 12.00
Heavy melting steel	9.25 to 9.50
Old carwheels	10.00 to 10.50
Relaying rails, 50 lb. and over	23.00 to 25.00
Agricultural malleable	8.00 to 8.50
Railroad malleable	9.25 to 9.50
Light bundled sheet scrap	7.50 to 8.00

Per Net Ton

Iron car axles	$16.75 to $17.00
Cast borings	5.50 to 5.75
Iron and steel turnings and drillings	5.00 to 5.25
Steel axle turnings	6.00 to 6.25
No. 1 busheling, new	8.00 to 8.50
No. 1 busheling, old	7.75 to 8.25
No. 1 railroad wrought	9.00 to 9.50
No. 1 cast	9.75 to 10.25
Stove plate	7.50

Cincinnati

CINCINNATI, OHIO, December 16, 1914.—(*By Wire.*)

Pig Iron.—Buying has subsided, and only a few scattering sales of 50 to 300 ton lots have been reported the past week, with the exception of one round tonnage order placed in central Ohio. The inquiry has also lightened, and no business of note is expected until after the first of the year. Prices have been quietly reduced on a large number of orders recently booked, and as low as $9.50, Birmingham, has been done on some first half business. While there is now a determined effort to re-establish the price schedule, it has only been partly successful, and for early shipment a few Southern brands are available at the figure named. The furnaces are generally asking $10, Birmingham, for first half movement, but some iron can yet be contracted for at 25c. lower for any delivery up to July 1. Northern foundry iron has also been adversely affected, but very few contracts have been made in the Ironton district below $12.75 at furnace for first half shipment, and it is understood that this figure cannot be shaded at the present time even on prompt business. As usual at this season, shipments are not going forward on old contracts as fast as might be desired; the exceptions noted are the jobbing foundries making a specialty of machine-tool castings which are taking all iron due them. Both malleable and basic are dull, and with the rolling-mill consumption at a low point there is not apt to be any heavy contracting for basic until conditions change. There is a more hopeful feeling in the trade, and a gradual improvement is expected by both producers and consumers of iron soon after the new year begins. Based on freight rates of $2.90 from Birmingham and $1.26 from Ironton, we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 f'dry and 1 soft	$12.90 to $13.40
Southern coke, No. 2 f'dry and 2 soft	12.40 to 12.90
Southern coke, No. 3 foundry	11.90 to 12.40
Southern No. 4 foundry	11.40 to 11.90
Southern gray forge	10.90 to 11.40
Ohio silvery, 8 per cent. silicon	17.20 to 17.70
Southern Ohio coke, No. 1	15.01 to 15.51
Southern Ohio coke, No. 2	14.01 to 14.51
Southern Ohio coke, No. 3	13.76 to 14.01
Southern Ohio malleable Bessemer	14.26
Basic, Northern	14.51 to 15.01
Lake Superior charcoal	15.25 to 17.25
Standard Southern carwheel	26.90 to 27.40

(*By Mail*)

Coke.—The inquiry for 15,000 tons of furnace coke from southern Ohio, still open, is the only one out for 48-hr. coke, with the exception of small lots for domestic use. Foundry coke continues in light demand. Most of the jobbing foundries now busy on machine-tool castings are covered for their future requirements as far ahead as April 1. Connellsville furnace coke is unchanged around $1.60 to $1.75 per net ton at oven and foundry coke is quoted at $2 to $2.25. Wise County and Pocahontas producers are holding out for an advance over the figures mentioned.

Finished Material.—The low prices prevailing have induced a number of buyers to make contracts for stocks of steel and iron bars, small structural shapes, etc. The reluctance of the mills to contract far ahead has held off considerable business that would have been placed, if present quotations were observed. However, mill agencies are not booking orders for shipment through the first half of next year, except to take care of old customers. Steel bars and small structural shapes are now quoted at 1.05c., Pittsburgh for prompt shipment, but the local store price is unchanged around 1.70c. to 1.75c. Sheets are moving slowly, but the outlook for next year is said to be encouraging. Prices for prompt shipment are around 2c., Cincinnati, or Newport, Ky., on No. 28 black sheets and 3c. on No. 28 galvanized.

Old Material.—The general sentiment among both buyers and sellers is more encouraging. Prices are firmer, and there is considerably more buying by foundries. While the rolling mills are not using up the average tonnage of scrap, there are indications that a much better demand from this source may be expected soon after the first of next year. The minimum figures given below represent what buyers are willing to pay for delivery in their yards, southern Ohio, and Cincinnati and the maximum quotations are dealers' prices f.o.b. at yards:

Per Gross Ton

Bundled sheet scrap	$6.25 to $6.75
Old iron rails	11.00 to 12.00
Relaying rails, 50 lb. and up	19.75 to 20.25
Rerolling steel rails	9.75 to 10.25
Melting steel rails	8.75 to 9.25
Heavy melting steel scrap	8.50 to 9.00

Per Net Ton

No. 1 railroad wrought	$7.50 to $8.00
Cast borings	4.00 to 4.50
Steel turnings	4.00 to 4.50
Railroad cast scrap	9.25 to 9.75
No. 1 machinery cast scrap	9.75 to 10.25
Burnt scrap	6.00 to 6.50
Old iron axles	13.50 to 14.00
Locomotive tires (smooth inside)	8.75 to 9.25
Pipes and flues	5.50 to 6.00
Malleable and steel scrap	6.75 to 7.25
Railroad tank and sheet scrap	4.50 to 5.00

The Pacific Coast Steel Company, Youngstown, Seattle, Wash., which recently purchased the steel plant at Irondale, Wash., formerly owned by the Western Steel Corporation, has begun to dismantle it for the purpose of removing the machinery to Youngstown.

Buffalo

BUFFALO, N. Y., December 15, 1914.

Pig Iron.—The total of new business placed for the week was only moderate, but it included one lot of 1000 tons and a number of 200 to 400 tons, of foundry and malleable. The orders booked were at prices recently established by Buffalo producers. Some of the foundries of the district are busy but the majority are still dull. There is no lack of hopeful feeling, and the stage is apparently gradually being set for an improvement in market conditions based on the easier monetary situation and the expected advance in railroad freight rates. For first quarter delivery we quote as follows, f.o.b. furnace:

No. 1 foundry	$13.25 to $13.50
No. 2 X foundry	13.00 to 13.25
No. 2 plain	13.00
No. 3 foundry	13.00
Gray forge	12.75 to 13.00
Malleable	13.00 to 13.25
Basic	13.50
Charcoal, regular grades and analysis	16.25 to 17.25
Charcoal, special grades and analysis	20.50

Finished Iron and Steel.—Considerable contracting has been done in bars, plates and shapes for first quarter and in some instances through the second quarter. Specifications have improved somewhat in the past few days and the total for the first 15 days of December will show considerable increase over the same period for last month. The tin-plate market has been very active and most users of that product have contracted for their first half requirements and in some instances through the entire season, but at somewhat irregular prices. Decision regarding the Bloor street viaduct, Toronto, has finally been made in favor of steel construction, and the city officials have awarded the general contract for its construction to Quinlan & Robinson, Montreal. The steel involved is about 6000 tons. The Buffalo office of the American Bridge Company has secured contract for 700 tons of steel for the wholesale grocery warehouse of George C. Buell & Co., Rochester. The city of Buffalo will soon advertise for bids for steel bascule bridge over the Buffalo River at Abbott road, requiring about 1200 tons.

Old Material.—A considerable total of business has been transacted and an increasing number of inquiries are being received, indicating that mills and users are feeling out the market with a view to covering requirements for first quarter. The market is firm but dealers' selling prices are unchanged, as follows, per gross ton, Buffalo:

Heavy melting steel	$9.50 to $10.00
Low phosphorus steel	12.50 to 13.00
No. 1 railroad wrought scrap	9.50 to 10.00
No. 1 railroad and machinery cast	10.00 to 10.50
Old steel axles	11.50 to 12.00
Old iron axles	16.00 to 16.50
Old carwheels	10.00 to 10.50
Railroad malleable	9.00 to 9.50
Machine shop turnings	5.00 to 5.50
Heavy axle turnings	8.00 to 8.50
Clean cast borings	5.50 to 6.25
Old iron rails	10.50 to 11.00
Locomotive grate bars	8.50 to 9.00
Stove plate (net ton)	8.00 to 8.50
Wrought pipe	6.50 to 7.00
Bundled sheet scrap	5.75 to 6.25
No. 1 busheling scrap	7.00 to 7.50
No. 2 busheling scrap	5.00 to 5.25
Bundled tin scrap	10.00

Birmingham

BIRMINGHAM, ALA., December 14, 1914.

Pig Iron.—It is admitted that there has been another week of liberal sales in this district, but the tonnage is difficult to arrive at on account of shaded prices at which many sales have been made. As low as $9.50 has entered into some of the transactions for spot delivery coupled with iron for the first half, and $9.75 has been frequently done in like manner. The disposition now, however, appears to return to the $10 basis, and this is being attempted in several quarters as the end of the year comes near. Middle Western and Eastern territory received the major share of the lowest price iron, as far as can be gathered. Based upon heavy sales, there have been some unusually large shipments, with double-header trains. A large amount of basic is believed to have been sold and much is on the inquiry list. The activity bids fair to last for another week at least, when the market will probably settle down to a more uniform basis. One large maker with heavy stocks is not much mentioned in the big trading involving the deeper cuts. The disposition to cover for the first half of the year is pronounced, and this has been the real cause of the price shading, the inducement being to get rid of the large accumulations still on the Alabama yards for realization purposes. No strictly second quarter purchase could be made under $10.25. The rail mill of the Tennessee Company at Ensley failed to receive orders sufficient to keep up operations after a week's activity and is again idle, the open-hearth and blooming-mill production returning to one-third capacity. We quote per gross ton f. o. b. Birmingham district furnaces, for first and second quarter, as follows:

No. 1 foundry and soft	$10.50 to $10.75
No. 2 foundry and soft	10.00 to 10.25
No. 3 foundry	9.50 to 9.75
No. 4 foundry	9.25 to 9.50
Gray forge	9.00 to 9.25
Basic	10.00 to 10.25
Charcoal	23.50 to 24.00

Cast-Iron Pipe.—There has been some increase of activity in pipe, but not of sufficient volume to justify any special optimism. Several orders came from the Middle West. Operations are on a 60 to 70 per cent. scale. We quote, per net ton, f. o. b. pipe shop yards, as follows: 4-in. $20; 6-in. $18, with $1 added for gas pipe. Concessions are reported on attractive specifications.

Coal and Coke.—There has been a slightly greater demand for coal, owing to the more severe weather, but otherwise the 50 per cent. basis of operations continues. Some more coal is being sent to gulf ports. Coke has sold more freely, without change in prices. We quote, per net ton, f. o. b. oven as follows: Furnace coke, $2.80 to $2.90; foundry, $3 to $3.25.

Old Material.—Dealers report a continuance of dull conditions and no prospect of immediate change. We quote, per gross ton, f. o. b. dealers' yards, as follows:

Old iron axles	$13.00 to $13.50
Old steel axles	12.50 to 13.00
Old iron rails	12.00 to 12.50
No. 1 railroad wrought	8.50 to 9.00
No. 2 railroad wrought	7.50 to 8.00
No. 1 country wrought	8.00 to 8.50
No. 2 country wrought	7.00 to 7.50
No. 1 machinery cast	9.50 to 10.00
No. 1 steel scrap	8.00 to 8.50
Tram carwheels	8.50 to 9.00
Stove plate	8.00 to 8.50

San Francisco

SAN FRANCISCO, CAL., December 8, 1914.

The previous quiet condition in jobbing lines has been intensified by a normal contraction of operations preceding the holidays. A quite general expectation prevails of moderate improvement in the first quarter over conditions lately prevailing. Most merchants will end the year with stocks closely cleaned up. A few first-quarter contracts are being placed, and specifications for goods to arrive in January are slightly more in evidence. Heavy rains have caused a much better feeling in the country.

Bars.—Figures are being taken for the Twin Peaks tunnel reinforcement, amounting to about 2500 tons, and for some other public work; but on the whole the tonnage of reinforcing bars remains far below normal. General jobbing business in soft steel bars is closely restricted.

Structural Material.—The Pacific Rolling Mill Company has taken the contract for the water-front post-office, requiring about 300 tons. Nothing else of importance has been closed, nor have any definite inquiries appeared, though several projects are in contemplation. The city is considering a new drawbridge over Channel Creek at Fourth street, and arrangements are being made for a new Masonic Temple at Sacramento. Bond issues carried at the November election included $1,800,000 for buildings at the University of California, $3,000,000 for state buildings at Sacramento and $1,000,000 for a state building in San Francisco.

Plates.—Estimates are being made on a number of large oil tanks for the navy yards on the Pacific coast.

Little new business is appearing for private tanks, but a fair tonnage is being taken for marine work all along the coast.

Sheets.—There is no longer any special demand for corrugated sheets, and distributive business in other lines is even lighter than last month.

Standard Pipe.—Oil-field business, though limited, is no longer entirely absent. Demand for the smaller sizes in the country has fallen off, and local trade remains quiet.

Cast-Iron Pipe.—The city of San Francisco is in the market for about 200 tons and the town of Escondido has sold a bond issue for waterworks extension. The city of Sacramento is considering propositions for waterworks improvements which will require a considerable tonnage. Gas and water corporation business is quiet.

Pig Iron.—The local market is heavily overloaded, the large arrivals of foreign iron for the last few months having found less demand than was expected. Unless foundry operations increase considerably, it is believed that the present supply will cover all requirements for nearly six months. Southern iron accordingly finds little demand. Prices are irregular, but some idea of current values may be obtained from the report of sales of No. 1 Middlesbrough at $19 to $20 per gross ton, ex ship.

Coke.—The recent heavy offerings have pretty thoroughly demoralized the market. Several vessels are still discharging, and both consumers and dealers are well supplied. The latter look for fairly high prices in the future, as no further supplies are available from the usual sources, but for the present there is no demand, with no definite basis of values.

Old Material.—All lines of scrap are quiet. Cast-iron scrap is moving in a limited way at a range of $14 to $16 per net ton. Steel melting scrap receives practically no attention, being nominally valued at $5 to $8 per gross ton.

W. B. Kyle, San Francisco representative of the McClintic-Marshall Company, has moved his office from the Monadnock Building to the new Call Building at New Montgomery and Jessie streets.

New York

NEW YORK, December 16, 1914.

Pig Iron.—Transactions in foundry iron have come down to rather smaller tonnages. The New York Central will buy 200 tons for its Frankfort, N. Y., foundry, and the Lackawanna Railroad has bought 300 tons for Scranton, Pa. A Government inquiry is for 350 tons for three navy yards. Interest in the Eastern market has been chiefly in pipe iron and the transactions have been for the most part through Philadelphia offices, though to some extent also with Virginia furnaces. A Virginia pipe interest has bought 10,000 tons of Alabama iron in addition to considerable Virginia iron. The report of buying by one eastern Pennsylvania pipe works to the extent of several thousand tons is unfounded. Buffalo furnaces, while holding to $13 as minimum for foundry iron, are not uniform in the advances they make on that price for higher silicons. In some cases $13.50 is quoted for forward delivery on 2.50 to 3 per cent. silicon iron. The absence of sharp Buffalo competition has stiffened the prices of eastern Pennsylvania furnaces and it is questioned if $13.50 at furnaces could be bettered by the average buyer, making the tidewater price $14.20 for No. 2 X. We quote Northern iron for tidewater delivery as follows: No. 1 foundry, $14.45 to $14.95; No. 2 X, $14.20 to $14.45; No. 2 plain, $13.95 to $14.20. Southern iron is quoted at $14.50 to $14.75 for No. 1 and $14 to $14.25 for No. 2.

Ferroalloys.—It is the understanding of representatives here of English producers of ferromanganese that arrangements are about completed whereby the embargo will be lifted and shipments resumed in the near future. The basis for such an outcome is the giving of a guarantee from this side that consumers will not re-export any of the alloy nor ship to England's enemies any steel into which the alloy has been incorporated. A further requirement is that shipments of such steel to neutral countries bordering on hostile countries shall be via London. While the difficulties of such a guarantee are recognized, still it is believed that satisfactory assurance is possible and that shipments will start again in January at the latest. It is to be borne in mind that a good many consumers of the alloy in this country are not exporters of steel to the countries against which the precautions are taken, and this aids in simplifying the matter. Quotations on the few inquiries before the market are $68, seaboard, for future delivery, subject to ability to deliver. Spot material, if any is available, would sell at about $75, seaboard. Contracts for 50 per cent. ferrosilicon for part of next year's supplies are available at the regular quotations of $71 to $73, Pittsburgh, according to quantity.

Finished Iron and Steel.—Chief encouragement is obtained in an increasing interest of manufacturers, and in some cases of jobbers, toward contracts, for new business has not yet materially increased nor is it regarded profitable with the prices ruling. Some of the feelers for contracts cover periods beyond the first half, all predicated on securing the present low prices with the speculative value they represent. The disinclination to close structural projects is greater and little large work is expected before early January. The larger companies, as regards prices, are strongly resisting concessions. Prompt business of attractive proportions is today at 1.05c., Pittsburgh, with not much done at this level; for first quarter 1.10c., Pittsburgh, is asked and for second quarter 1.15c. The only exception is that in a few instances 1.05c., Pittsburgh, for plates is being shaded 50c. a ton. One other promising sign than the interest of contract buyers is the increasing number of rumors of likely railroad car purchases. Conspicuous among these are some circumstantial reports, though not confirmed, that the Russian Government railroads are to place 15,000 cars in Pittsburgh for shipment across the Pacific. In actual business, the Pressed Steel Car Company has received 100 more tank cars for the Santa Fé, the American Car & Foundry Company has 400 steel upper and underframes for the Philadelphia & Reading, and the Pennsylvania Railroad is to build at its Altoona shops 1050 steel box cars. The awards in the case of 500 tank cars for the Union Tank Line and 200 cars for Westmoreland Coal Company are expected shortly. Some 4000 tons of plates as well as 2000 tons of shapes will also be required for the two Standard Oil tank steamers to be built by the Newport News Shipbuilding & Dry Dock Company. Another round tonnage of plates is involved in nine fuel oil tanks 106 ft. in diameter and 32 ft. high for five different navy yards on which the Pittsburgh & Des Moines Bridge & Iron Works is low bidder. The McClintic-Marshall Company is low bidder for 1200 tons for a storehouse for the navy at Washington and John Cashman & Sons Company, Boston, is low at 2¼c. per lb. erected, for 1000 to 1200 tons for the steel pier at New Bedford, Mass. We quote prompt mill shipments of steel bars, shapes and plates at 1.05c. to 1.10c. Pittsburgh, or 1.21c. to 1.26c., New York, but 1.10c. to 1.15c., Pittsburgh, or 1.26c. to 1.31c., New York, for first quarter, and iron bars at 1.20c. to 1.25c., New York. For lots from store we quote iron and steel bars at 1.80c. to 1.85c., New York, and plate and structural material at 1.85c. to 1.90c.

Cast-Iron Pipe.—The only new municipal letting of importance is that of Providence, R. I., which will be opened December 21 and calls for 900 tons of 4 to 16 in. The letting at Newton, Mass., on which bids were opened December 10 on 225 tons, went to the Standard Cast Iron Pipe & Foundry Company at about $21 delivered. The bids were very close. Private buying is considerably heavier than usual for the season. The Detroit contract for 25,000 tons has been awarded to the American Car & Foundry Company at $21.45. Much resentment is felt among pipe makers at the manner in which this contract has been awarded, as the successful contestant was not the low bidder but was permitted by the commissioners of the city of De-

troit to make a second bid after all the figures were known. The reason for this action was the desire of the city authorities to place the work with a local foundry and thusgive more employment to local workmen. Prices of pipe have not yet been raised, but conditions are gradually getting in shape for the strengthening of quotations. Carload lots of 6 in. are still quoted at $20 to $20.50 per net ton, tidewater.

Old Material.—The entire trade is experiencing a better feeling and prices have been advanced about 25c. per ton on nearly the whole list. Foundries continue to purchase fair quantities of heavy cast and stove plate. While the steel works and rolling mills have not entered the market as active buyers, the Western improvement in the old material trade is bound to be felt here shortly, and dealers are, therefore, still more confident than they have been. Quotations are as follows, per gross ton, New York:

Old girder and T rails for melting	$7.25 to $7.50
Heavy melting steel scrap	7.25 to 7.50
Relaying rails	19.00 to 19.50
Rerolling rails (nominal)	8.00 to 8.25
Iron car axles	14.00 to 14.25
Steel car axles	10.25 to 10.75
No. 1 railroad wrought	8.75 to 9.25
Wrought-iron track scrap	8.25 to 8.75
No. 1 yard wrought, long	8.25 to 8.75
No. 1, yard wrought, short	7.25 to 7.50
Light iron	3.50 to 4.00
Cast borings	5.50 to 6.00
Wrought turnings	5.50 to 6.00
Wrought pipe	7.00 to 7.25
Carwheels	8.75 to 9.25
No. 1 heavy cast, broken up	9.75 to 10.25
Stove plate	7.50 to 8.00
Locomotive grate bars	6.25 to 6.75
Malleable cast	7.00 to 7.50

Boston

BOSTON, MASS., December 15, 1914.

Old Material.—The dealers have not yet felt the advance in steel scrap reported from Pittsburgh, but the market is a trifle stiffer. The quotations given below are based on prices offered by the large dealers to the producers and to the small dealers and collectors, per gross ton, carload lots, f.o.b. Boston and other New England points which take Boston rates from eastern Pennsylvania points. Mill prices are approximately 50c. per ton higher.

Heavy melting steel	$7.00 to $7.75
Low phosphorus steel	13.75 to 14.75
Old steel axles	12.75 to 13.25
Old iron axles	20.25 to 20.75
Mixed shafting	12.00 to 12.25
No. 1 wrought and soft steel	8.25 to 8.75
Skeleton (bundled)	5.50 to 5.75
Wrought-iron pipe	7.00 to 7.50
Cotton ties (bundled)	5.25 to 5.75
No. 2 light	3.25 to 3.75
Wrought turnings	5.00 to 5.50
Cast borings	5.00 to 5.25
Machinery cast	10.75 to 11.00
Malleable	7.50 to 7.75
Stove plate	7.00 to 7.50
Grate bars	5.25 to 5.50

British Trade Grows Stronger

Heavy Pig-Iron Contracts Closed—Steel Trade Better—France Wants Wire

(*By Cable*)

LONDON, ENGLAND, December 16, 1914.

Pig iron is strong, with good buying. The output is hampered by labor scarcity. Considerable of the consumption is largely in connection with government needs. Substantial contracts, both in foundry iron and hematite, have recently been closed for future delivery. Nothing is being done in ferromanganese but an export permit has been issued for Italy. The general steel position grows stronger. Canada is offering wire products and semi-finished steel and some sheet bars have been sold at £5 3s. 6d. ($25.18), c.i.f. Glasgow. Great difficulty is being experienced in getting freight room. Huge inquiries for wire are being received from France. Complaints are being made here regarding the quality of some of the imported wire rods and wire. Stocks of pig iron in Connal's stores are 102,828 gross tons against 106.618 tons last week. We quote as follows:

Tin plates, coke 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 12s. 7½d. ($3.07), against 12s. 6d. ($3.04) last week.

Cleveland pig-iron warrants (Tuesday), 53s. 7½d. ($13.05), against 51s. 7½d. ($12.56) last week.

No. 3 Cleveland pig iron, makers' price, f.o.b. Middlesbrough, 54s. ($13.14), against 52s. ($12.66) last week.

Steel black sheets, No. 28, export, f.o.b. Liverpool, £8 15s. ($42.58), against £8 10s. ($41.36) last week.

Steel ship plates, Scotch, delivered local yards, £6 17s. 6d. ($33.45), against £6 15s. ($32.84) last week.

Steel rails, export, f.o.b. works port, £6 5s. ($30.41).

Hematite pig iron, f.o.b. Tees, 70s. ($17.03), against 67s. 6d. ($16.42) last week.

Sheet bars (Welsh), delivered at works in Swansea Valley, £4 17s. 6d. ($23.72).

Steel joists, 15 in., export, f.o.b. Hull or Grimsby, £6 15s. ($32.84), against £6 10s. ($31.62) last week.

Steel bars, export, f.o.b. Clyde, £7 5s. ($35.28), against £7 ($34.06) last week.

Trade and Prices Better—Sharp Rise in Ocean Freight Rates—Large Orders for Ships

(*By Mail*)

LONDON, November 26, 1914.—(Delayed in transmission).—There has been a rather sharp switching round of sentiment, which until the last few days was one of considerable despondency, all the more remarkable because of the entire shutting off of competition from the Continent, and of the absence of forcing tactics on the part of American producers. The first manifestations of the improvement, which has since made some progress, appeared in the hematite pig iron trade. This has been enormously affected by the difficulties in obtaining tonnage to ship ores from Spain. It must be remembered that the British Government has at the present moment about 1300 vessels on time charter, as transports and so forth, and the removing of this amount of tonnage from the freight market has had the inevitable effect. Freights are all up in the skies, and whereas a few weeks ago a voyage was worth about 8s. ($1.95) charterers are now scrambling for any available boats at 20s. ($4.87). As far as ore loading from Spain this year is concerned boats are literally not to be had. For outward freights (coal), Tyne to Genoa, the price is about 20s. ($4.87) now and this sort of figure kills ore chartering, with pig iron prices at about 50s. ($12.17) or 51s. ($12.41) for basis grades of foundry material. The initial impetus in hematite was started by one or two large purchases already mentioned to you by cable. The statements so cabled were vigorously denied by some here, but they were literally true, and the effect which they had on the market, when full credence was given, has been seen in the rapid jump in prices.

INCREASED ACTIVITY IN SHIPBUILDING

Another very important thing and one also bearing upon the war is the broad stream of new orders for vessels. This is proving the critical point of the steel market. The Government having taken up so many boats, there was a scarcity of tramp tonnage, which developed very quickly. To repair this, large orders were placed for steamers for quick delivery. Then the builders rushed into the market for steel to cover their needs, and so the ripple of demand spread itself until the market began to respond to the impetus, and prices now are above the worst with a very reasonable chance of a sustained further improvement being seen. Steamers are cheap at today's prices, and there are practically no other yards but our own which can handle orders. The German yards are out of the running, and will be for many a day. Hence the full brunt of demand falls upon the British builder who is taking particular good care that he picks up every crumb which is available.

In the finished iron trade there is no life, but as increased activity is being shown in steel it is perhaps not unreasonable to hope that there may be an extension of buying in this particular direction. After all, the wiping out of the Continent as a producer of

finished iron ought in time to be of immense importance to the British makers of this material.

DEPRESSION IN TIN PLATES AND SHEETS

The tin-plate and galvanized sheet trades are very indifferently situated. As regards tin plates the trouble centers upon the wholesale prohibitions of exports. At the moment no plates may be shipped to Holland, Denmark and Sweden, and this has caused a lot of material to be held up and many resales at very low prices have been made. There are certain firms on the Continent who are trying to supply the enemy with materials for the purpose of assisting them in the war, and it is the firm determination of this Government that they shall not succeed, so far as British supplies are concerned. Hence the net has been cast wide. No doubt some hardship has resulted for the Welsh trade, but this cannot be helped just now. Later on things will be adjusted. As for galvanized sheets no improvement is possible till the export trade picks up, and of this there are no present indications.

Metal Market

NEW YORK, December 16, 1914.

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York			Lead		Spelter	
Dec.	Lake	Electrolytic	Tin, New York	New York	St. Louis	New York	St. Louis
9	13.00	12.87½	32.50	3.80	3.67½	5.65	5.50
10	13.00	12.87½	32.75	3.80	3.67½	5.70	5.55
11	13.12½	13.00	33.37½	3.80	3.67½	5.75	5.60
12	13.25	13.00	.....	3.80	3.67½	5.80	5.65
14	13.37½	13.12½	34.75	3.80	3.67½	5.80	5.65
15	13.62½	13.37½	34.75	3.80	3.67½	5.80	5.65

Copper has advanced because of foreign buying. Tin is higher with spot stocks rather scarce. Lead is inactive with a weaker tendency. Spelter is higher under a good export demand. Antimony is lower.

New York

Copper.—Interest amounting at times to excitement has been shown as a result of the advancing prices and reports of heavy buying. With regard to the latter, it is certain that the bulk of the purchasing has been on foreign account. At first there was a suspicion that prices were being advanced without due cause, but this feeling disappeared with definite information that Europe had been a good buyer. The high point was reached yesterday when electrolytic advanced ¼c. to 13.50c., delivered Naugatuck Valley, 30 days, which is equal to 13.37½c., cash New York. In Lake there has been a large movement directly or indirectly for export, all of which may be classed as war business. Some Lake producers have practically exhausted their stock of certain brands.

Tin.—The week has been marked by alternate periods of dullness and moderate activity, but on the whole a fair tonnage changed hands. December 9 a few hundred tons were sold, mostly for future delivery. Less business was done on the following day and on December 11. A feature which developed on the latter day was that two steamers were leaving London without a single ton of tin aboard. Since then it has been learned that still another ship is bringing no tin. All of this raises a question as to the sufficiency of spot supplies to meet the demands of this month and explains the rise in price December 11 from 32.75c. to 33.37½c. On December 12 there were buyers for all positions at reasonable prices, but sellers were few and not much business was done. Yesterday there were moderate sales here and a sharp rise in London which is as yet unexplained. Spot standard went up £3 10s. and spot Straits, £4. A curious development of the market is that Russia has been inquiring in this market for 250 tons and has actually bought 100 tons, although London would seem her natural market. Arrivals this month total only 365 tons. There is afloat 1970 tons.

Lead.—The market is dull and barely steady and in the opinion of the trade is suffering from the recent cut in prices. The foreign demand has been good. The New York quotation is unchanged at 3.80c. and that at St. Louis is also without change at 3.67½c.

Spelter.—Quotations are higher and strong at the new level because of excellent exports and the manner in which they have been sustained. The New York quotation is 5.80c. to 5.85c. and that at St. Louis, 5.65c. to 5.70c.

Antimony.—Business is light in all directions and quotations are weaker. They are 14c. for Hallett's, 15c. for Cookson's and 13c. for Chinese.

Old Metals.—The market is strong and higher. Dealers' selling prices are as follows:

	Cents per lb.
Copper, heavy and crucible	12.25 to 12.50
Copper, heavy and wire	11.75 to 12.00
Copper, light and bottoms	10.75 to 11.00
Brass, heavy	9.00 to 9.25
Brass, light	7.00 to 7.25
Heavy machine composition	11.00 to 11.25
Clean brass turnings	8.25 to 8.50
Composition turnings	9.50 to 9.75
Lead, heavy	3.55
Lead, tea	3.30
Zinc, scrap	4.00

Chicago

DECEMBER 14.—A sharp increase in the strength of the market, coupled with a decided activity largely influenced by European developments, shows itself in an advance of most metal quotations, with trading much more free than in many weeks. We have revised quotations as follows: Casting copper, 13c. to 13.25c.; Lake copper, 13.50c., for prompt shipment; small lots, ⅛c. to ¼c. higher; pig tin, carloads, 34.75c.; small lots, 37.50c.; lead, desilverized, 3.75c., and corroding, 4c., for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 5.75c.; sheet zinc, 8.50c.; Cookson's antimony, 18c. to 20c., for cask lots; other grades, 17c. to 18c. On old metals we quote buying prices for less than carload lots as follows: Copper wire, crucible shapes, 10.50c.; copper bottoms, 9c.; copper clips, 10c.; red brass, 9.50c.; yellow brass, 7c.; lead pipe, 3c.; zinc, 3.50c.; pewter, No. 1, 24c.; tinfoil, 28c.; block tin pipe, 28c.

Iron and Industrial Stocks

NEW YORK, December 16, 1914.

The New York Stock Exchange resumed trading in a limited list of stocks on Saturday, December 12, that day of the week having been selected because of the short session. The opening was made auspiciously, buying orders being sufficiently numerous to impart strength to the entire list. The trading on Monday was of a character to inspire confidence in the outcome, and it was decided by the authorities of the Exchange to throw open the entire list on Tuesday. Business on the Exchange is now proceeding in strictly normal fashion. Quite a number of stocks have moved upward, showing a striking change for the better since the closing of the Exchange July 30. The range of prices on active iron and industrial stocks from Saturday of last week to Tuesday of this week is as follows:

Allis-Chal., com	8	Nat. Enam & St., com.	10⅝ - 11⅛
Allis-Chal., pref.	34 - 35½	Pressed Stl., com.	33½ - 37
Am. Can, com.	24¾ - 27⅞	Pressed Stl., pref.	100
Am. Can, pref.	91¼ - 92⅞	Ry. Spring, com.	21⅛ - 25½
Am. Car & Fdy., com.	42¼ - 46	Republic, com.	18 - 20¼
Am. Car & Fdy., pref.	114	Republic, pref.	75½ - 78
Am. Loco., com.	21⅞ - 25	Rumely Co., com.	5⅝ - 6¾
Am. Steel Fdries.	26	Rumely Co., pref.	21 - 23
Bald. Loco., pref.	102¼	Sloss, com.	21 - 22½
Beth. Steel, com.	40¾ - 42	U. S. Steel, com.	50¾ - 55
Beth. Steel, pref.	85¼ - 87⅝	U. S. Steel, pref.	104⅝ - 105⅝
Colorado Fuel	21½ - 25½	West'gh'se Elec.	64½ - 70
General Electric	138 - 141	Am. Ship, pref.	77
Gt. N. Ore Cert.	26¾ - 29	Cambria Steel	42½ - 44½
Int. Harv., com.	91 - 93	Warwick	10
		Cruc. Steel, com.	12 - 13¾

Dividends

The American Brake Shoe & Foundry Company, regular quarterly, 2 per cent. on the preferred and 1¾ per cent. on the common stock, payable December 31.

The Bethlehem Steel Company, regular quarterly, 1¼ per cent. on the preferred stock, payable January 2.

The Western Electric Company, regular quarterly,

2 per cent. and extra 2 per cent., payable December 31.

The Sloss-Sheffield Steel & Iron Company, regular quarterly, 1¾ per cent. on the preferred stock, but payable in scrip. This is the first time the company has failed to make a quarterly payment in cash since April, 1900. The scrip will be delivered January 1 and will bear interest at 6 per cent. a year. While the dividend had been earned, the management thought best to conserve cash resources in this period of dullness in the trade.

The Baldwin Locomotive Works, regular semi-annual, 3½ per cent. on the preferred stock and 1 per cent. on the common stock, payable January 1.

The American Iron & Steel Mfg. Company regular quarterly, 1¼ per cent., on both the preferred and common stocks, payable January 1.

The United Shoe Machinery Corporation, regular quarterly, 37½ cents on the preferred stock and 50 cents on the common stock, payable January 5.

The Canadian Locomotive Company, regular quarterly, 1¾ per cent., on the preferred stock, payable January 1.

A Time to Put Plant in Order

Bowman-Blackman Machine Tool Company, St. Louis, suggest in the following that the present is the best time to put plant in shape for handling the demand which is confidently expected, the one uncertainty being as to the time of its coming:

"During the boom preceding the panic of 1907 we saw demoralization caused in the machine tool trade by speculation resulting from numerous shops trying to increase their facilities in the midst of the rush. Machinery houses betting on the chance that they would be able to sell them by having them coming along at better than prevailing deliveries were moved to place orders with tool builders for more machines than needed. Tool builders' books accordingly were filled with orders largely fictitious, running deliveries on machines up to six, eight and twelve months. Premiums were paid for quick deliveries when obtainable on such terms. Buyers often took undesirable and unsuitable machines and handicapped themselves with them for years, because they could get nothing else. Men who really wanted machines and had real money to pay with could not get them because of the blockade due to speculative and fictitious orders placed earlier. Those buyers who needed machinery, who could dispose of all their product they could get out at excellent prices, waited long months for equipment, then saw it stand around for weeks after arrival while being tooled and installed by men taken from profitable, productive work. There was waste right and left. In due time along came the panic and the speculative and fictitious business referred to was cancelled and we in the machine tool trade saw deliveries on some machines improve from many months to immediate, almost over night.

"Cannot we reasonably urge users to make their installations while business is dull, and they have time to study out exactly what they need, and salesmen have time to help them thoroughly, and mechanics kept on the payroll with little to do can with due care make up the tools and jigs? Machinery prices are lower than they will be later."

About 75 per cent. of the steel plates and bars imported into British Columbia have been supplied by Germany and Belgium, according to Consul General R. E. Mansfield, of Vancouver, Canada, the remainder coming from England and the United States. Tool steel has come mainly from continental Europe. Total imports of iron and steel and manufactures thereof into Vancouver for the fiscal year 1912-1913 were valued officially at $8,447,467.

The Toledo Metal Mfg. Company, Toledo, Ohio, recently organized to take over the plant of the Toledo Tank & Boiler Company, will produce a general line of steel plate work and will make a specialty of storage and pneumatic tanks. Joseph F. Grosswiller is president and J. M. Sawhill, secretary and treasurer.

German Iron and Metal Trades

The latest issues of the London Iron and Coal Trades Review and the Ironmonger to reach this side contain matter taken from the German press on various phases of war conditions in German industries.

In Lorraine-Luxemburg the works are making preparations to resume. Supplies of coke are coming in regularly, and the dispatch of ore to Westphalia is in progress. The rolling mills are chiefly operating the structural and rail trains in consequence of the call for the delivery of bridge material, rails and sleepers; but the lighter trains, which mainly work for export trade, are at a standstill. The wire works are again at work on barb wire for the army.

Prices for bar iron have receded. Some works will not quote below 110 marks ($26.18) per ton for soft steel bars, but it is reported there are sellers at 104 to 105 marks ($24.75 to $24.99). Some contracts from neutral countries are being received, the average export figure being 115 to 120 marks ($27.37 to $28.56) at works.

The tube business shows a slight improvement. In gas tubes and socket pipes trade is unsatisfactory as the building trades are at a standstill, and pipes are only being laid to a limited extent. Prices are little changed, discounts being 81 to 84 per cent. The export trade is cut down two-thirds. The proposed tube syndicate is dropped.

Deliveries of the Pig Iron Syndicate in October amounted to 47.5 per cent. of the allotments, against 49.7 per cent. in September and 92.14 per cent. in October, 1913.

As to tin plates in Germany a correspondent from Holland states that there is a great scarcity of them for canning food for the army. There are six tin-plate works in Germany, but one of these, that of François de Wendel at Hayange, is on the French border, and is owned by Frenchmen. This plant has been closed. Germany is ordinarily a large buyer of Welsh black plates for use by German enamelware manufacturers. This source of supply being closed, German enamelware makers cannot supply their trade, which is largely export.

The Prussian Ministry of Commerce has issued a notice permitting the export of all special steels in blooms and semi-finished products, with the exception of nickel or nickel-chrome steel. Semi-finished products of nickel and nickel-chrome steel may be exported if they have been manufactured before September 1, 1914. For the exportation of products manufactured after that date, the permission of the German Imperial Chancellor must be obtained in each case. The export of nickel or nickel-chrome steel in ingots is forbidden.

The International Spelter Syndicate has been dissolved. The question of the continuance of the German Spelter Works Association is under consideration. Belgian works, which are members, cannot now supply spelter.

Before the war the total monthly consumption of lead in Germany was about 24,000 tons, which was covered by a home production of 15,500 tons and an import of 8500 tons. The imports have now diminished by 5800 tons a month. The demand has increased, but the German Lead Association refuses to execute orders for goods which can be replaced by other metals if necessary. The decrease in stocks has resulted in a continuous rise in prices. Silesian raw lead has advanced to 470 to 485 marks ($111.86 to $115.43) per ton, against 370 to 395 marks ($88.06 to $94.01) in July. Contracts for lead products have been received for military purposes which will keep the makers fully occupied for some months.

In the nine boiler explosions in industrial plants in the German empire in 1913, according to Stahl und Eisen, 26 persons were injured, 8 of whom were killed, 6 severely and 12 slightly wounded. The corresponding figures for 1912 were 11 explosions with 33 persons injured of whom 10 were killed, 13 severely and 10 slightly wounded.

BRAZING STELLITE TO STEEL

Cutting Tools Composed of Machine Steel with Stellite Cutting Edge

Thomas Fish, president of the Ready Tool Company, Bridgeport, Conn., has made a number of experiments having for their object the welding or brazing of Stellite to a large section of machine steel. This work was undertaken on account of a desire to use Stellite in various ways that were not possible heretofore, owing to the fact it was both brittle and expensive and that some means of holding it other than the usual mechanical method of a set screw or taper pin was necessary. The object of the machine steel was to give a proper form of support for the Stellite as well as eliminating waste. In these experiments practically all kinds of brazing material and fluxes were tried, and various methods of welding were experimented with. These, however, were generally unsuccessful because of the absence of carbon, the brass or spelter rolling off the Stellite as though it had been greased. Neither the electric nor the autogenous welding processes were found to be successful, the former by reason of quick expansion and contraction and the latter because the Stellite became contaminated with the melted steel.

As a result of these experiments it was found that a special brazing material and a special brazing flux were both required, the latter being the more important. Another precaution that had to be observed was the bringing of the work up to a certain temperature to get the spelter to flow and at the same time not burn it. The successful conclusion of these experiments will, it is believed, open up a wide field for Stellite as a cutter, fastened in this way to the body of a cutting tool. The company expects to be in a position by the first of January to fill orders for practically all sizes.

Book Review

Graphic Methods for Presenting Facts. By Willard C. Brinton. Pages, 380, 7 x 10 in.; profusely illustrated. Publisher, the Engineering Magazine Company, 140-142 Nassau street, New York. Price, $4.

The graphic presentation of facts, figures and deductions has grown rapidly in recent years. Almost every writer who desires to impress his views on his readers, and whose ideas will adapt themselves in any way to graphic illustration, resorts to this method of assisting the presentation of the subject he has at heart. The practice, as shown by the numerous forms employed, has apparently called for the exercise of the author's ingenuity. The great variety of methods followed in graphic illustration can, however, hardly be appreciated unless some study has been given to the subject such as is set forth in this volume by Mr. Brinton. He states that, as far as he is aware, no book published in any language covers the field attempted to be covered in this book. The illustrations have been selected partly on account of the educational value of the facts but chiefly because of the methods used in presentation.

The work is more than a mere compilation of the various methods used in graphic illustration. The author has arranged the diagrams, charts, maps, etc., with a view to presenting systematically the subjects covered. He has gone much further and has criticised many of the illustrations in the hope that all such criticisms will be accepted as an honest attempt toward an advance in the art of showing data in graphic form. In some instances, however, it is possible that Mr. Brinton has not quite grasped all the limitations confronting the author of a diagram which he criticises. An instance of this kind occurs on pages 109 and 110, on which a cast-iron pipe diagram is referred to that was taken from *The Iron Age*. Mr. Brinton is of the opinion that the chart thus given should be extended to the zero line of the vertical scale instead of stopping at a certain price, which happened to be the lowest price touched. It would seem to us that the extension of the diagram to zero would be an unnecessary enlargement of the engraving bill as well as of the space occupied in a paper in which space is valuable. The book is exceedingly interesting to those who have to deal with statistical or other facts and will undoubtedly be a valuable means of educating writers to use the proper kind of charts or diagrams to fit their purposes.

Recent Analyses of Chateaugay Pig Iron

Since the beginning of the war and the consequent reduction of imports of low-phosphorus pig iron from Sweden, various Eastern consumers who have depended on the Swedish product have come to regard domestic low phosphorus as a satisfactory substitute and have sought it as a certain source of supply. Among the number are makers of high grades of fine wire, tool steel, armament, projectiles, car wheels and rolls. In this connection interest attaches to some recent analyses of Chateaugay iron from the furnace of the Northern Iron Company, Standish, N. Y. There has been a gradual reduction in the phosphorus content of this iron, that element now ranging from 0.02 to 0.016 per cent., while the sulphur averages 0.015 or less. Silicon, which is according to specifications, varies from 0.6 to 3.50 per cent. The practice of the Northern Iron Company is to pile, analyze and ship each cast separately and furnish an analysis with each carload. The current output at Standish is fairly represented by the following analyses of consecutive casts:

Lot	Phosphorus	Silicon	Sulphur
1498	.019	1.28	.017
1499	.018	1.50	.017
1500	.017	1.15	.0175
1501	.018	1.32	.0195
1502	.018	1.16	.0165
1503	.018	1.50	.0175
1504	.018	1.62	.0155
1505	.019	1.32	.015
1506	.018	1.60	.015
1507	.020	1.70	.014
1508	.019	1.80	.016
1509	.019	1.53	.0175
1510	.018	1.57	.017
1511	.018	1.40	.0155
1512	.018	1.34	.0175
1513	.018	1.32	.0165
1514	.018	1.52	.0195
1515	.017	1.05	.016
1516	.017	1.32	.0135
1517	.018	1.50	.015
1518	.018	1.78	.0135
1519	.018	1.92	.013
1520	.018	1.85	.0135
1521	.018	1.05	.015
1522	.018	1.55	.0165
1523	.017	1.52	.017
1524	.018	1.20	.0155
1525	.018	1.80	.020
1526	.018	1.70	.0155
1527	.017	1.30	.0165

The ore from which Chateaugay iron is manufactured has been mined for more than a cenurty and formerly was used in the production of charcoal blooms. It is located four miles from the furnace and is obtained at various depths ranging to 1200 ft. below the surface. In its natural condition it is very low in phosphorus and by crushing and magnetic concentration practically all of the phosphorus in the natural ore is physically removed with the gangue. The latter is largely feldspar. A large proportion of the final concentrates is treated in a nodulizing kiln.

A Poor Half Year's Pig Iron Buying

In writing of the pig iron market under date of December 12 Matthew Addy & Co., Cincinnati, make this comment on the half year's business: "The furnace order books which were lean and hungry have begun to fill out. In this particular market all kinds of iron have been bought. There seems nothing reckless or speculative about the orders which are being placed, for apparently in spite of the very low prices no one is buying beyond actual needs. A study of the statistics shows that the last six months are the poorest that the iron trade has known in many years. Less than half the iron was bought that was purchased in the similar period preceding. The figures of one large furnace company are in the proportion of 19 to 8, and these probably represent about the general average. So it is high time that the iron trade should begin to make a start to recover the ground it has lost."

IMPROVEMENT IN JANUARY

President James A. Farrell on the Outlook in the Steel Trade

James A. Farrell, president of the United States Steel Corporation, was a visitor in Pittsburgh on Friday, December 11, and was entertained at dinner at the Pittsburgh Athletic Association in the evening by A. C. Dinkey, president of the Carnegie Steel Company. A number of representative business men and Carnegie Company officials were present as guests. Mr. Farrell gave out an interview on the outlook for business, particularly in the steel trade, from which we take the following:

"It is too soon to make forecasts with certainty, but it would seem that with the disturbance of all ordinary productive conditions within the territories of the nations now at war, and the almost complete shutting off of the foreign trade of Germany and Austria, we should profit greatly by enlarged demand for such products as we can supply, and can supply in almost limitless abundance. It is this view that furnishes foundation for the hope and expectation that now seems largely to prevail among business men, as I gather it; but there is a lot of foolish, even mischievous, matter being put out.

EXPORT TRADE NOT EASY TO GET

"We should see a material enlargement of our foreign trade in future years, but we must be prepared to cultivate it. We must study the needs of those who would buy from us, must accommodate ourselves to their ways and methods of doing business. We should not overlook the fact that in South American countries finance, commerce and transportation are largely, if not entirely, controlled by Europeans, and particularly by men whose commercial enterprises come into competition with ours. We must make commercial friends, and in order to do so we must be able to communicate with them in their own language. We must also be able and willing to accommodate them in financing trade interchanges. They are all new but developing countries. Capital with them is slower of increase than our own, because of less population and also because they must depend almost entirely on the yields of their agricultural activities. Their manufacturing enterprises are meager as compared with Europe or the United States. Besides, we have had but a small amount of their trade so far as their purchases of manufactures enter into our interchanges. This has been because we have had few or no direct steamship lines; also because our financing with them has been almost, if not entirely, through London. This has been a handicap.

BETTER DEMAND FOR STEEL

"I look for improvement after the opening of the new year. I am of the opinion that there will be a considerable demand for iron and steel products after the railroad rate question is decided. I also believe that we are to experience a considerable demand for iron and steel for shipbuilding, but that will be somewhat tardy in developing. The number of merchant and war ships that have been sunk foretells a great activity in shipbuilding, but whether we shall do our share of it will depend largely on the legislation that is yet in a chrysalis state. The fact that merchant ships that were owned by Americans have been permitted to register and fly the American flag should help foreign trading in countries where only foreign flags have been seen on ships, and therefore should make other peoples better acquainted with our country and develop interest in what we may have to serve them with.

"But there is another phase of this question. International trade is a matter of exchange of products, and we are competitors with all except those that produce tropical and semi-tropical fruits and grains. We must develop a system of international exchange of products. We must prepare to buy back cargoes of their products for our ships and to reship to other nations a part of what we buy from them. This is the foundation of the great oversea trade of Great Britain. So that, when one reflects on the complexities of this question it loses its apparent simplicity, and we come to realize that the exigencies of war and present necessities of a situation that is unsettling to the ordinary courses of commerce cannot be relied upon as a foundation for a future foreign trade that will be permanent. There must be preparation, study of conditions necessary to be conformed to, financing that will accommodate itself to the conditions. All of these require deep and careful study, judicious advances toward a fixed end. It must be a growth; it cannot be a creation."

Specifications for Lap-Welded and Seamless Boiler Tubes

On September 25 representatives of boiler tube manufacturers adopted a standard specification for lap-welded and seamless boiler tubes. It differs in only a few details from the corresponding specifications of the American Society for Testing Materials. The specification is important, however, in one point at least, that it stands for an agreement of those in direct competition and for this the American Society of Mechanical Engineers is to be given the credit, through the activities of its committee which has been engaged for over three years in establishing a steam boiler code covering construction and maintenance. It was out of the hearings and deliberations which this committee held that the manufacturers were brought together, and it is a commentary on the co-operative spirit of the manufacturers' representatives that they were quickly able to assist the mechanical engineers' committee in their joint recommendation. With the American Society for Testing Materials specifications as a base, the work of drawing the new specification was rendered doubtless easy. One of the main points, it may be said in passing, lies in the variation from gauge allowed, which requires that all tubes be up to the gauge specified at the thinnest point. The other important feature is the use of an impact test on lap-welded tubes while under pressure. The manufacturers whose representatives signed the specification were: Alleghany Steel Company, Monongahela Tube Company, National Tube Company, Parkesburg Iron Company, Pittsburg Steel Products Company, Reading Iron Company, Spang Chalfant & Co., Tyler Tube & Pipe Company and Worth Brothers Company.

The specification is in part as follows:

Process.—"Lap-welded tubes shall be made of open-hearth steel or knobbled hammered charcoal iron. Seamless tubes shall be made of open-hearth steel." (The A. S. T. M. specifications for steel and iron tubes are not combined and the new specification so far as it covers iron tubes is a departure from the A. S. T. M. iron tube specification.)

Chemical Properties and Tests.—The stipulations apply to the steel tubes and are the same as in the A. S. T. M. steel tube specifications.

Physical Properties and Tests.—"Flange test. A test specimen not less than 4 in. in length shall have a flange turned over at right angles to the body of the tube without showing cracks or flaws. This flange as measured from the outside of the tube shall be ⅝ in. wide." (There is no reference to diameter of tube as in the A. S. T. M. specification.) Flattening Tests.—A test specimen 3 in. in length shall stand hammering flat until the inside walls are brought parallel and separated by a distance equal to three times the wall thickness, without showing cracks or flaws. In the case of lapwelded tubes, the test shall be made with the weld at the point of maximum bend. [A test specimen 4 in. in length shall stand hammering flat until the inside walls are in contact, without cracking at the edges or elsewhere. For lap-welded tubes care shall be taken that the weld is not located at the point of maximum bending.] (The portion in brackets is the A. S. T. M. specification. No crushing tests are provided for, as the A. S. T. M. specifications.) Hydrostatic Tests.—Tubes under 5 in. in diameter shall stand an internal hydrostatic pressure of 1000 lb. per sq. in. and tubes 5 in. in diameter or over, an internal hydrostatic pressure of 800 lb. per sq. in. *Lapwelded tubes shall be struck near both ends, while under pressure, with a two-pound hand hammer or the equivalent* (The part in italics is new.)

The part of the new specification covering test specimens, number of tests and retests is substantially the same as the A. S. T. M. specification. A table of standard weights does not form a part of the new specification.

Workmanship and Finish.—The finished tubes shall be circular within 0.02 in. and the mean outside diameter shall not vary more than 0.015 in. from the size ordered. *All tubes shall be carefully gaged with a B.W.G. gage and shall not be less than the gage specified, except the tubes on which the standard slot gage, specified, will go on tightly at the thinnest point, will be accepted.* The length shall not be less, but may be 0.125 in. more than that ordered. (The part in italics is new.)

The remainder of the specification is not materially different from the A. S. T. M. specification. In marking, the name or brand of the manufacturer, the material from which it is made, whether steel or charcoal iron, and "Tested at 1000 lb." for tubes under 5 in. in diameter, or "Tested at 800 lb." for tubes 5 in. in diameter or over, shall be legibly stenciled on each tube.

German Steel Production

The steel production of Germany for the months of July, August and September of this year are given in Stahl und Eisen for November 19, the statistics being those of the German Iron and Steel Association. In September the German steel output totaled 663,223 metric tons, while in August it was 566,822 tons and in July 1,627,345 tons. The following shows the output of the various kinds of steel by months in metric tons:

	July	August	September	Jan. 1 to Oct. 1
Basic Bessemer ingots.	923,589	258,534	264,399	6,787,928
Acid Bessemer ingots..	7,894	7,771	7,390	73,977
Basic open-hearth ingots	624,746	258,776	347,093	4,750,708
Acid open-hearth ingots	21,091	14,439	15,295	230,993
Basic steel castings...	21,192	11,909	12,481	167,662
Acid steel castings....	9,994	4,466	5,424	74,310
Crucible steel	8,563	8,124	7,819	69,844
Electric steel	10,276	2,810	3,322	68,064
Total	1,627,345	566,829	663,223	12,223,486

From another source the pig-iron and steel ingot production for the first nine months of this year is given in the following table:

1914	Pig iron, tons	Steel ingots, tons
January	1,556,505	1,583,783
February	1,455,511	1,507,423
March	1,602,896	1,624,718
April	1,534,429	1,487,623
May	1,607,193	1,587,703
June	1,531,313	1,557,870
July	1,564,345	1,627,345
August	586,661	566,822
September	580,087*	663,223
Total, nine months	12,018,940	12,206,510

*In *The Iron Age* for December 5 the September output of pig iron was given as 518,184 tons. Corrected statistics show an increase.

The decline in production of iron and steel is relatively less in Rhineland-Westphalia, Silesia, Siegerland, Hessen-Nassau, Saxony and central Germany than in the frontier districts of the Palatinate, Lorraine and Luxemburg. The large plants in Lorraine and Luxemburg are reported as working on a somewhat greater scale in October than in September.

SHIPMENTS OF THE STEEL WORKS UNION

The deliveries of the German Steel Works Union in October amounted to 280,570 metric tons as compared with 245,194 tons in September, 1914, and 524,891 tons in October, 1913. They were composed of 46,023 tons of semi-finished steel, or 40.44 per cent. of the month's allotments; 74,574 tons of shapes, or 35.48 per cent., and 159,973 tons of railroad material, or 74.66 per cent. of the allotments for October. The total deliveries in October amounted to 54 per cent. of those in October, 1913, and to nearly 60 per cent. of the deliveries in July, 1914. An increase in business is noted in spite of the advance of 7.5 om. ($1.80) per ton in the price of semi-finished steel for the fourth quarter of this year. The general meeting of the union this month will determine prices for the first quarter of 1915. No change is expected in quotations for semi-finished steel and shapes.

EXPOSITIONS IN NEW YORK

Special Industrial Exhibits Now Being Held or Announced for the Near Future

Two interesting expositions opened in the Grand Central Palace on December 14 and will continue until December 19. These are the Second International Exposition of Safety and Sanitation, under the auspices of the American Museum of Safety, and an Exposition of Inventions. The general theme of safety in daily routine, travel and walking, runs through both expositions. New devices and inventions for the protection of workers against accidents are displayed, and the exhibits range all the way from safety matches to elevators and boiler plate hoisting apparatus.

Among the especially interesting displays may be mentioned that of the Diamond Match Company, illustrating the change from the old-fashioned poisonous phosphorous match to the non-poisonous sesqui-sulphide phosphorous match. To show that this new match is not poisonous some of the material is fed to a small family of guinea pigs. Models and charts also demonstrate what methods are employed to protect the workers in the company's factories all over the United States from poisoning.

An exhibit of the New Jersey Zinc Company consists of photographs and charts showing how the workingmen in its plant are protected from poisoning, and how their health is built up by public playgrounds and wholesome living conditions.

The Westinghouse Electric & Mfg. Company has displayed a number of the safety appliances used in its plants, such as milling cutter and saw guards, a chippers' screen, an electrical switch protected by a metal screen and a press suction feeding device, which was illustrated in *The Iron Age*, April 23, 1914.

MADE IN U. S. A. EXPOSITION

In the Grand Central Palace, New York, the "Made in the U. S. A." Industrial Exposition will be held from March 6 to 13, 1915. It will be national in its scope and will embrace a comprehensive exhibition of American manufactures in all lines of industry. At the time for the exposition New York City is the mecca of buyers from all sections of the country. Special efforts are being made by export and other associations to bring South American and other foreign buyers to the city at this time. The management of the exposition, it is stated, will be in the hands of experienced organizers of shows and industrial expositions. The exposition is designed to increase the sales of American made goods to our own and foreign buyers and to educate the public to the fact that goods can be bought from our manufacturers which have heretofore been purchased abroad.

EFFICIENCY EXPOSITION IN APRIL

An Efficiency Exposition will be held at the Grand Central Palace, New York City, from April 24 to May 1, 1915. It will be under the direction of the Efficiency Exposition Company, composed of members of the Efficiency Society. The exposition will be composed of displays intended to give expression to the increasing application of scientific methods in modern conditions, and it is the purpose of the company to make the 1915 exposition of greater educational value than the one held last year. It is stated that the 1914 Efficiency Exposition was viewed by a greater number of executives than any other exposition ever held in New York. The total attendance was 69,000, which placed the show third in point of attendance of New York's greatest expositions.

The Nashville, Chattanooga & St. Louis Railroad is inquiring for 6 Mikado and 6 Pacific type locomotives. According to the Railway Gazette of London for November 27 "the Russian railroads are short of rolling stock and the Ministry of Ways and Communications finds it urgent to order 116 freight locomotives and 15,700 freight cars more than provided for in the ordinary credits."

OCTOBER FOREIGN TRADE

Tonnage Exports, 53 Per Cent. Greater Than September—Imports Decline

The checking of the decline in the exports of iron and steel and the manufactures thereof shown in the September report of the Bureau of Foreign and Domestic Commerce is apparent also in the October statistics of the country's foreign trade. The total value of such exports was $16,455,832 against $12,531,102 in September, or a gain of approximately 31.2 per cent. The value of these exports in October was 65.4 per cent. of the 1913 figure, as against 43.6 per cent. in September. The value of the iron and steel and the manufactures thereof imported in October was $2,069,433, against $2,159,965 in September and $2,575,741 in October, 1913.

The exports of commodities for which quantities are given totaled 147,293 gross tons in October, as compared with 96,482 tons in September, 86,598 tons in August and 220,545 tons in October, 1913. These tonnages have increased approximately 53 per cent. over the figures for September and are 68.8 per cent. of those for October, 1913. Out of the 23 quantities given in the table which are comparable with 1913, 10 show increases. The most noticeable is billets, which increased from 2846 tons in 1913 to 6771 tons this year, a gain of approximately 150 per cent. Wire rods, wire nails and barb wire are being exported at approximately twice the rate of a year ago, while tin and terne plates, which have increased every month of the present fiscal year over the corresponding month of last year, registered an increase of almost 40 per cent. The total value of iron and steel exports for which tonnages are given was $6,090,148 in October, against $4,048,248 in September and $8,784,132 in October, 1913. The average value per ton of these exports was $1.52 more in October, 1914, than in 1913, but slightly less than in September, 1914, the figures being $41.35, $39.83 and $41.96 respectively.

Details of the exports of these tonnage commodities in October and the 10 months ended with October as compared with the same periods of the previous calendar year are as follows:

Exports of Iron and Steel

	October		Ten months	
	1914, Gross tons	1913, Gross tons	1914, Gross tons	1913, Gross tons
Pig iron	5,524	27,817	97,538	233,855
Scrap	1,012	6,284	30,289	78,406
Bar iron	679	884	4,380	13,455
Wire rods	5,716	3,150	47,311	53,154
Steel bars	9,411	15,532	88,681	180,931
Billets, ingots and blooms, n.e.s.	6,771	2,846	40,033	88,563
Bolts and nuts	1,502	1,982	13,321	19,383
Hoops and bands	1,104	855	7,748	14,138
Horseshoes	905	73	2,953	1,023
Cut nails	177	473	3,227	3,152
Railroad spikes	477	1,069	6,449	10,298
Wire nails	5,927	3,005	27,354	37,535
All other nails, including tacks	450	287	2,555	3,333
Pipes and fittings	.....	20,396	*104,487	261,206
Cast pipes and fittings	8,264	.....	†25,529	.....
Wrought pipes and fittings	9,879	.....	†39,885	.....
Radiators and cast-iron house heating boilers	386	674	3,097	7,311
Steel rails	22,057	41,159	161,830	413,124
Galvanized-iron sheets and plates	2,740	3,362	32,932	69,282
All other iron sheets and plates	547	349	7,014	20,466
Steel plates	9,958	17,521	94,323	201,623
Steel sheets	10,003	19,144	107,467	123,847
Structural iron and steel	12,234	33,377	160,491	342,708
Tin and terne plates	5,950	4,301	50,734	52,922
Barb wire	15,130	7,942	67,723	66,760
All other wire	10,490	8,063	64,111	90,980
Totals	147,293	220,545	1,291,462	2,387,455

*Figures are for six months, January to June, inclusive.
†Figures cover period since June 30.

In the month of October the imports of commodities for which tonnages are given amounted to 22,754 gross tons, as compared with 38,420 tons in September, 28,769 tons in August and 20,838 tons in October, 1913. It will thus be seen that the tonnage imports in October were about 59.1 per cent. of those in September and only approximately 9 per cent. more than last year. As was the case in September, bar iron, tin, and terne plates and wire rods all declined from the figures of the previous month and the corresponding month of last year. Steel billets without alloys shows the greatest decline from the 1913 figures, the imports this year being only 107 tons, as compared with 774 tons in 1913. Sheets and plates increased from 29 tons in October, 1913, to 389 tons in 1914.

Details of the imports of tonnage commodities in October and the 10 months ended with October as compared with the corresponding portions of the last calendar year are as follows:

Imports of Iron and Steel

	October		Ten months	
	1914, Gross tons	1913, Gross tons	1914, Gross tons	1913, Gross tons
Pig iron (including ferrosilicon)	.....	.....	.....	*120,612
Ferrosilicon	650	306	5,591	†306
All other pig iron	11,079	9,322	118,209	†9,322
Scrap	4,430	2,221	28,923	40,087
Bar iron	1,208	1,753	15,250	24,612
Structural iron and steel	346	328	8,825	10,153
Hoop or band iron	125	.....	‡648	.....
Ingots, blooms and steel billets	2,693	.....	33,710	*17,765
Steel billets without alloys	107	774	1,847	†774
All other steel billets	.....	2,017	.....	†2,017
Steel rails	1,299	2,738	19,981	7,145
Sheets and plates	389	29	3,744	2,586
Tin and terne plates	112	135	14,716	15,737
Wire rods	316	1,215	5,958	13,879
Totals	22,754	20,838	257,402	264,995

*Figures cover period January 1 to October 3, inclusive.
†Figures cover period beginning October 4.
‡Figures cover period beginning July 1.

The total value of the exports of iron and steel and the manufactures thereof in the 10 months ended with October, 1914, was $169,232,670, as compared with $251,676,318 in the same period of 1913, and the import figures were $24,947,236 and $28,292,118 respectively.

Imports of iron ore in October amounted to 114,341 gross tons, against 109,176 tons in September, 135,693 tons in August and 274,418 tons in October, 1913. For the 10 months ended with October 1,210,093 tons was imported, as compared with 2,191,151 tons for the same period of 1913.

First Aid Treatment of the Injured

With a view to rendering the instruction for first aid treatment more available, the Conference Board on Safety and Sanitation, of which Magnus W. Alexander, General Electric Company, West Lynn, Mass., is secretary, has issued a set of instructions. These cover the routine that should be followed in treating common injuries and disorders. The instructions are very concise and thus calculated to enable the person using them to concentrate his mind on what should and should not be done. The instructions for resuscitation follow the prone pressure method which was recommended some years ago by a committee consisting of authorized representatives of the American Medical Association, the National Electric Light Association and the American Institute of Electrical Engineers.

The board has also devised a system for following up cases in which first aid has been rendered, so that instances in which the real extent of the injury has been underestimated or in which serious consequences developed by reason of the impaired physical condition of the patient or other reasons unknown to the first aid man might be brought to the attention of the factory authorities. This system makes use of a record card containing spaces for the name of the injured, the nature and location of the injury and the disposition of the case. A supply of these cards is given to each first aid man who is instructed to fill one out for each injury he treats and forward it to some responsible person in the establishment designated for this purpose.

The establishment of a Swedish-American transatlantic steamship line by the popular subscription in Sweden of $1,666,000 is announced by Consul General Ernest L. Harris of Stockholm by cable to the Daily Consular and Trade Reports. Service will probably begin in 1916.

Meeting on Compensation and Unemployment

Workmen's compensation and unemployment are to be discussed at the annual meeting of the American Association for Labor Legislation, to be held at the Hotel Walton, Philadelphia, December 28 and 29.

Among the papers and addresses announced are the following: Monday afternoon December 28, immediately after luncheon, Daniel J. McGillicuddy, introducer of the Kern-McGillicuddy bill in the House of Representatives, "Workmen's Compensation for Federal Employees," and John Mitchell, as a member of the New York Compensation Commission, "The Operation of the New York Workmen's Compensation Law." The programme goes on to say that "The New York compulsory compensation law, which went into effect on July 1, 1914, has attracted much attention as the most liberal American law in payments to the injured. With four options for the employers, it affords an interesting comparison of plans of insurance. An administrative board of five members supervises the payments growing out of more than 18,000 accidents reported and nearly 5,000 claims filed each month. Among interesting points for discussion is the charge of discrimination based on physical examination of the workers."

In the afternoon session, J. Barry Colahan, member of the Pennsylvania Commission on Workmen's Compensation is to discuss "Proposed Workmen's Compensation Law for Pennsylvania," Joseph H. Parks, member of the Massachusetts Industrial Accident Board, "What Scale of Compensation Should be Adopted?" and Wallace D. Yaple, chairman of the Industrial Commission of Ohio, "Administration by Commission or by Courts?"

On Monday evening, with Charles R. Henderson, of the University of Chicago and secretary of the Chicago Commission on the Unemployed, as presiding officer, a session is to be given over to unemployment problems with an address by the mayor of Philadelphia and discussions on the subject under two headings: Private Action and Public Action. Under the former, Robert G. Valentine, industrial counsellor and chairman of the Massachusetts Committee of the Association on Unemployment will discuss "The Industrial Establishment," and Arthur M. Huddell, secretary and treasurer of the Building Trades Council, Boston, is to take up the question from the standpoint of "The Workers." As regards public action in connection with unemployment, Morris L. Cooke, director of public works, Philadelphia, will discuss the question under the head of "The City"; John Price Jackson, commissioner of the Pennsylvania Department of Labor and Industry, under the head of "The State," and Meyer London, congressman-elect of New York City, under the head of the "The Nation."

Unemployment problems will also be taken up at the Tuesday morning session, with the reports of special investigators of the American Association on Employment.

In the afternoon will occur the annual business meeting of the Association and the reception of a number of committee reports, including "Industrial Hygiene," by Dr. W. Gilman Thompson, New York; "The Enforcement of Labor Laws," by W. F. Willoughby; "One Day of Rest in Seven," by John Fitch, and "Standard Schedules and Tabulations" by Leonard W. Hatch.

Pressed Steel Car Company Additions

To meet the demand for all-steel passenger cars for months sweeping over the country, the Pressed Steel Car Company had to build additions to its McKees Rocks plant. These additions, which are now about completed, include an extension to the general machine shop, 81 x 265 ft. in size.; a second story to a 60 x 220-ft. brick building, the first floor being devoted to the finished steel department and the second to cabinet work; a second story to a 40 x 220-ft. brick building, given up on the first floor to the templet and carpenter shops and on the second floor to the storage of templets; an addition, 43 x 156 ft., to the forge shop for additional blacksmith room; two new paint and finish shops for painting and finishing work now in process of erection, one 100 x 435 ft. and the other 148 x 435 ft., and a storehouse building, 148 x 180 ft., between the two paint shops, this of fireproof construction for the lockers and toilet facilities for the employees of the paint shop, in addition to the storage for passenger-car finish materials. The machine shop has two aisles, each about 40 ft. wide. There is a balcony floor in the one, this for the smallest machine tools and with a cement floor, while the other is spanned by a 5-ton electric crane with the entire main floor of wood block on a concrete base. A 175-ton 78-ft. transfer table runs the entire length of the new shops to transfer cars to any track of the new buildings, as well as to tracks in the freight car paint shop, where the painting and finishing of passenger cars is now done and part of which will be used also for equipping passenger cars. A steel yard runway has also been installed 90 ft. wide, 30 ft. high and 817 ft. long, served by two 20-ton overhead traveling cranes.

A Steel Manufacturer on Causes of Present Industrial Conditions

James Bowron, president of the Gulf States Steel Company, whose vigorous comments on iron trade conditions will be remembered by those who attended the meeting of the American Iron and Steel Institute at Birmingham, Ala., in October, has had occasion to write to a Birmingham daily paper which had misquoted expressions he recently made on the condition of business. The following from his letter may appropriately be reprinted when many unfounded statements are being published as indicating returning prosperity:

"I made no reference, whatever, to orders coming to this district, or of men being put back to work. I am not 'enthusiastic' over present conditions, or 'most optimistic.' How could I be when we are running our wire mill three days per week, and our bar mill three days per month, and when I am taking some business at cost, or a shade under it, to avoid shutting down the blast furnace, coal mines and coke ovens, which had previously been scheduled to take place today? [December 1.] By this means I have saved a thousand men in this and the Gadsden district from being put out of work, and I am thankful for having been able to do it.

"I do believe, if you will allow me to express my opinions, that the country has suffered from five causes: 1. The attitude of the Government towards large corporate enterprise. 2. The acute railroad situation. 3. The Underwood tariff. 4. The change in our system of banking. 5. The war. Out of these five adverse conditions, one is disposed of, as the starting of the Federal reserve banking system permits the distribution of reserves which for the past eleven months have been largely immobilized, waiting for redistribution. This must make money more plentiful and elastic, and contribute toward a revival of the building trades, which will help lumber in Alabama and structural and reinforcing steel.

"The tariff situation is temporarily helped by the war, which precludes foreign competition in iron and steel. When the war is ended, however, this competition will be renewed as soon as German and Belgian works can be restored to active operation, and it will then be necessary to repeal or modify the Underwood tariff.

"The effect of the war is to establish cross currents. The States of the Central West and Northwest and certain lines of industry are prospering by the misfortunes of our friends across the sea, and if Southern farmers will heed advice and plant food crops, diminishing their cotton area, they will have prosperity in 1915.

"The attitude of the Government toward corporate enterprise, and that of the Interstate Commerce Commission toward the railroads yet remain to be developed. There is ground to look to improving conditions, if for no other reason, that they could hardly become worse. But we are a long way removed from a condition of prosperity, and I am unwilling to have extravagant views attributed to me."

SEEKING MACHINERY TRADE

Special Agent Massel, of the Department of Commerce, Sailing for South America

WASHINGTON, D. C., December 15, 1914.—For the purpose of investigating markets in South America for machinery, including machine tools, etc., J. A. Massel, recently appointed a commercial agent of the Department of Commerce, will sail in a few days for Buenos Aires, Argentina. His itinerary will include the principal cities of Argentina, Uruguay, Chile, Bolivia, Peru, Ecuador, Colombia and Venezuela. It is probable, but not positively determined, that he will not go to Brazil. In preparation for his trip he recently made a tour of the plants of the leading manufacturers of machinery and machine tools of the United States and acquainted himself with the condition of the industry in this country and the desires of producers with respect to the extension of their export trade. By the special direction of Dr. Edward Ewing Pratt, chief of the Bureau of Foreign and Domestic Commerce, Mr. Massel has prepared for *The Iron Age* the following statement, describing his recent tour of investigation and summarizing the objects of his South American trip.

"I have completed my trip to the various States, visiting the most prominent tool shops. At every establishment I visited I was invariably received by the president, vice-president, treasurer, secretary or general manager and in many instances by all of the officers of the firm. The reception accorded me was highly cordial and without exception every place gave me the fullest opportunity of studying the product, placing at my disposal an expert for that purpose.

"Being familiar with machinery in general and the export business as well, I noticed with pleasure that the criticism of the way American machinery is being packed for export, especially to South and Central American countries, absolutely cannot be applied to the machine tool industry. No machine could be packed any better for export than it is actually done by the machine tool builders. I was also well impressed in glancing over some of the catalogues and specifications covering different tool machines sent me, by the way they specified fully a certain equipment for a certain price in the clearest possible manner, which I may say is not always true of some other lines of machinery exports. In regard to materials employed in the tools manufactured it appears to me that no expense is being spared in putting in the best to be had and finishing them in the best and most scientific way. The same is true as to design of the various types of tools in their shops and to be used for different purposes. I have seen in some shops tools working for eight and ten years without showing wear and tear to any noticeable extent.

THE MACHINE SHOP STATUS

"It is rather a difficult matter to define business conditions at the present time. Some shops are very busy, working full force and time and others are even working overtime. This is true of lathe manufacturers, especially of small sizes, and arsenal equipment tools. On the other hand, the builders of planers, milling machines, gear cutting machines, etc., are complaining of very bad times. Some of them are working only four days with reduced forces, although they are all hopeful, seeing indications of better times ahead. The most affected district seems to be Worcester, Mass., where I was told there are 10,000 metal workers out of jobs. The European conflict stimulated the machine tool business considerably. Large orders have been placed from abroad and a number of inquiries are being received almost daily, while the domestic trade in a good many places is practically at a standstill, according to a statement made to me. I gained the impression that the Cincinnati tool builders are busier than those of the eastern States. The good fellowship existing between the tool builders in Cincinnati enables them to retain any and all inquiries right in their city. For example, should a lathe builder receive an inquiry for a boring machine the lathe manufacturer will direct the inquirer to a boring machine manufacturer in Cincinnati and no other place.

INFORMATION TO BE GATHERED

"From the conversations I had with the manufacturers and from my own experience, I think the following information will be essential for them to have from the various outside markets for machinery:

"1. Kind and type of tools used.

"2. To what extent and how employed.

"3. Make of tools so employed.

"4. Through what sources the tools are mainly bought.

"5. The methods the foreign manufacturer uses to sell.

"6. Terms of payment.

"7. Do any dealers carry a stock of tools and if so to what extent.

"8. Names and standings of firms and individuals who could act as agents or representatives for our manufacturers.

"9. Number of railroad shops, repair shops and like places using or likely to use machine tools.

"10. Names of buyers or men responsible for placing orders.

"In my reports I shall also endeavor to point out characteristics and methods of doing business in Latin America, with recommendations with relation to such essential things as catalogues, languages, salesmen and representatives." W. L. C.

Chattanooga Coke Plant Contracts

The Chattanooga Gas & Coal Products Company, Chattanooga, Tenn., has let contracts for the construction and equipment of its new coke and by-product plant. The Wellman-Seaver-Morgan Company, Cleveland, Ohio, and the West Gas Construction Company, Ft. Wayne, Ind., will manufacture and erect the coke oven equipment. The Allis-Chalmers Mfg. Company, Milwaukee, and the General Electric Company will furnish machinery and the Converse Bridge Company, Chattanooga, Tenn., will fabricate and erect the structural steel. The Casey-Hedges Company, Chattanooga, will supply the storage and filtering plants. Beaumont & Co., Philadelphia, will furnish and install all coal-handling equipment, including belt-conveyors for loading and unloading cars and transferring coal and coke.

Reorganization of the Alton Steel Company, Alton, Ill., which has been for some time in receivership, is being arranged by holders of the second mortgage bonds. A sale of the plant will be made at a date shortly to be set, after which the bondholders, creditors and others will complete the details of an entire reorganization. Those most interested in the reorganization are J. C. Williams, H. C. Fownes, W. C. Fownes, Sr. and Jr., and I. A. Colby. The resumption of operations will not be undertaken until all claims against the company are settled and the Fownes interests will dominate in the reorganization. James Duncan, Alton, Ill., is receiver.

Pittsburgh and Nearby Districts

J. R. Flannery London, England, chairman of the Pittsburgh foreign trade commission, has sent an inquiry to Pittsburgh mills for about 8000 tons of steel bars.

While in Farrell, Pa., last week, President James A. Farrell, of the Steel Corporation, stated that work on the benzol plant to be constructed in connection with the local by-product coke ovens would be started at an early date, and that about $500,000 would be spent on this project.

The Union Drawn Steel Company, Beaver Falls, Pa., manufacturer of bright finished steel in various forms, has opened a new warehouse at 19 to 23 St. Aubin avenue, Detroit, Mich., under the management of Walter J. Bothwell as district sales manager. This warehouse will carry a large stock of shafting, screw steel, nickel and open-hearth axle steel, case-hardening steels and elevator guides. The company now maintains five warehouses which are located in New York City, Philadelphia, Chicago, Cincinnati and Detroit. Mr. Bothwell will be assisted at the Detroit warehouse by Fred W. Walters and John Andrews.

The Pennsylvania Railroad Company has placed an order with its car shops at Altoona, Pa., for 1050 class X25 all-steel box cars. The cars are for 1915 delivery. The order was placed at this time to enable the material to be obtained in time to start on the cars early next month.

The strike at the plant of the National Drawn Steel Company, East Liverpool, Ohio, maker of high grade drawn steel, has been settled and the men have returned to work on the terms of the company.

This week 8 of the 12 open-hearth furnaces of the plant of the Carnegie Steel Company at Farrell, Pa., are in operation.

The independent plate glass manufacturers, including the Allegheny Plate Glass Company, Edward Ford Plate Glass Company, Standard Plate Glass Company, Saginaw Plate Glass Company and Federal Plate Glass Company, have formed the National Association of Plate Glass Manufacturers of America. Temporary offices have been opened in the First National Bank Building, Pittsburgh, and officers elected for the first year are J. W. Wickes, president, Saginaw, Mich.; J. H. Troutman, vice-president, Butler, Pa.; J. R. Johnston, secretary and treasurer, Pittsburgh. This is the first effort on the part of these companies to organize a trade association, and one of its prime objects is to develop foreign trade in plate glass.

Negotiations have been concluded for the erection of a freight terminal building on West Ninth street, Cleveland, Ohio, to cost about $2,000,000. It will be a concrete and steel structure, partly 8 and partly 12 stories high, and will contain 9,000,000 cu. ft. of storage room. It will be provided with 11 elevators, 11 automatic conveyers and other handling equipment. The building will be erected by the West Ninth Street Terminal Company, which is being financed by the Home Financing Company, of which A. A. Mudge, Williamson Building, is the secretary and treasurer.

The Detroit Foundrymen's Association, Detroit, Mich., held its meeting December 10. The speaker of the evening was C. G. Smith, president and general manager of the Pittsburgh Emery Wheel Company, who took for his subject "The Increased Efficiency and Economy Obtained by the Introduction of Safety Devices in Grinding Practice." Mr. Smith is a member of the State Safety Board in Pennsylvania and brought out several important points for consideration by the members of the association.

A new malleable aluminum alloy is being produced by the Pioneer Brass Works, Indianapolis, Ind. It is claimed to be 10 to 50 per cent. stronger than regular No. 12 aluminum castings, and only 3 per cent. heavier. Besides being malleable, it is said to have a closer grain than ordinary aluminum castings and to be without pin holes.

PERSONAL

John A. Sutton, first vice-president of the Crucible Steel Company of America, Pittsburgh, has returned from an extended trip to Europe.

N. C. Harrison, superintendent of rolling mills and steam and hydraulic engineer for the Pittsburgh Crucible Steel Company, Midland, Pa., has resigned, effective January 1, to become chief engineer of the Atlanta Steel Company, Atlanta, Ga.

In the issuing of certificates of life membership in the National McKinley Birthplace Memorial Association, especial attention was given to the certificate issued to H. C. Frick, who was the largest contributor to the fund for the building of the memorial at Niles, Ohio. When appealed to for a contribution, Mr. Frick sent his check to President J. G. Butler, Jr., of the association for $50,000.

Heinrich J. Freyn, 5201 Harper avenue, Chicago, has resigned as third vice-president of the H. Koppers Company, Chicago. He has not yet announced his plans for the future.

E. H. Haslem, engineer of Mackintosh, Hemphill & Co., Pittsburgh, has returned from a business trip to Europe.

Albert E. Manchester, Milwaukee, Wis., superintendent of motive power of the Chicago, Milwaukee & St. Paul Railroad, and in charge of the West Milwaukee locomotive, car and repair shops, celebrated, December 16, the fiftieth anniversary of his connection with the company. In honor of the golden jubilee of continuous service, President Albert J. Earling and other officials of the road arranged a banquet in Mr. Manchester's honor at Hotel Pfister, Milwaukee, on the evening of that day. Fifty years ago Mr. Manchester was given a job as machinist apprentice in the shop of the railroad at Portage, Wis.

Harold J. Lloyd, general manager Metal & Hardware Products, Ltd., London, England, sails for home shortly after a business trip of several weeks to this country.

E. Ericksen, a Norwegian mechanical engineer, has entered the employ of the Allied Machinery Company of America, 55 Wall street, New York. He is now visiting machine tool plants in this country after which he will go abroad to open and manage a Scandinavian office for the company.

H. A. Reader has resigned as general superintendent of T. F. Stroud & Co., Omaha, Neb., to become production manager of the Union Chain & Mfg. Company, Seville, Ohio.

L. Lubinski, director of Nickelsburg & Co., Ltd., London, England, is in this country in connection with purchases of steel products.

Alfred C. Nelson, who has been associated with Arthur G. McKee, engineer of Cleveland, Ohio, for nine years, has resigned to take up private engineering practice after January 1.

W. S. Chase, sales manager of the National Acme Mfg. Company, Cleveland, Ohio, arrived home December 12 from a two months' trip to Europe.

C. R. Waller, chief engineer, De Laval Steam Turbine Company, read an illustrated paper on "Steam Turbines" before the first annual meeting of the Engineers' Club of Trenton, N. J., December 10.

Arthur E. Jackman has been appointed manager of the machinery department of the Walter A. Zelnicker Supply Company, St. Louis, succeeding J. J. Hilpirt, resigned to take a position with an oil company at Tampico, Mexico. Mr. Jackman has a practical knowledge of steam and electrical machinery and has had wide experience.

Robert Geddis, of the Jones & Laughlin Steel Company, Pittsburgh, is in England.

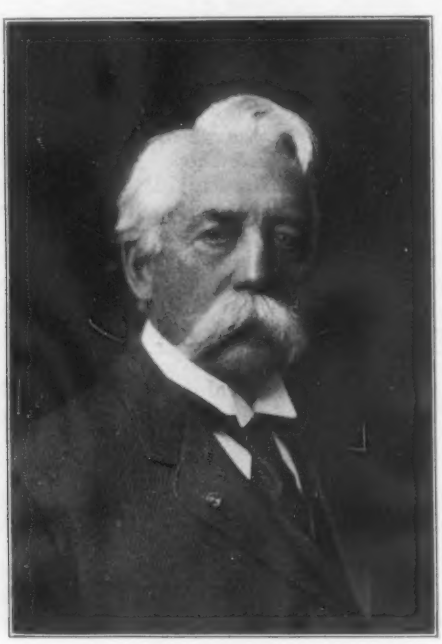
S. DIESCHER & SONS
Mechanical and Civil Engineers
PITTSBURGH, PA.

OBITUARY

Col. Edward D. Meier

Col. Edward Daniel Meier, president Heine Safety Boiler Company, St. Louis, died December 15 at the home of his son-in-law, William W. Schevill, at 44 West Seventy-seventh street, New York, aged 73 years. He was born in St. Louis, and after being graduated from Washington University in 1858, spent four years in Germany at the Royal Polytechnic College, in Hannover. He then became apprenticed to the Mason Locomotive Works, at Trenton, N. J., but in 1863 enlisted in the Thirty-second Pennsylvania Regiment. After the battle of Gettysburg he joined the Second Massachusetts Battery, and was also in the Engineer Corps. On May 30, 1865, he received the surrender of Lieut.-Gen. John B. Hood and staff.

Colonel Meier then entered the Rogers Locomotive Works at Paterson, N. J., and in 1867 became superintendent of machinery of the Kansas Pacific Railroad. In 1870 he became chief engineer of the Illinois Patent Coke Company, and in 1872 secretary and constructing engineer of the Meier Iron Company. He designed the



COL. E. D. MEIER

machinery department of the St. Louis Interstate Fair in 1873, and in 1884 organized the Heine Safety Boiler Company.

Colonel Meier introduced the Diesel motor into this country, and until 1908 was president of the American Diesel Engine Company. In 1898, as president of the American Boiler Manufacturers' Association, he drew up the uniform American boiler specifications. He was president of this organization for years. He was president of the American Society of Mechanical Engineers in 1911, and in 1913 represented the society in Germany, at a joint meeting with the Society of German Engineers, which 300 American engineers attended. On this occasion he presented the German Industrial Museum in Munich in behalf of the American Society of Mechanical Engineers with a large model of the Panama Canal, and Dr. Oskar von Miller, director of the museum, presented the American Society with Frauenhofer's original telescope.

EDWARD CLARK PAGE, vice-president Page-Storms Drop Forge Company, Chicopee, Mass., died December 14, aged 66 years. The Page-Storms Company is one of the largest firms making drop forgings in that section of the State. Born in Chicopee Falls, his education was received in the public schools and Williston Seminary. After passing some years in the coal and wood business in Minneapolis, Minn., he returned to Chicopee and entered the employ of the Lamb Knitting Machine Company, rising to the position of superintendent. Severing his connection with that company in 1902, Mr. Page formed the Page-Storms Drop Forge Company, entering into partnership with F. F. Storms for that purpose. The undertaking was successful and the plant has grown to one of much importance. He leaves two sons. Frank L. Page, president National Equipment Company, Springfield, Mass., and George Page, president Page Paper Box Company, Chicopee Falls, are his brothers.

CARL FREDERICK ULRICH, general sales manager of the Vilter Mfg. Company, died at Milwaukee, Wis., December 10, after a brief illness, aged 62 years. He was born in Apolda, Germany, and received his technical education in the Royal Institute of Technology in Chemnitz, Saxony, and the Polytechnic Institute of Karlsruhe. In the capacity of mechanical engineer he was engaged by several large manufacturers in Germany for the design, sale and erection of large machinery installations in Russia, Norway, Sweden, etc In 1882 he came to America and was connected with concerns at Cincinnati, St. Louis and Chicago. In 1885 he became chief engineer for the Weisel & Vilter Mfg. Company, now the Vilter Mfg. Company. He leaves his wife, two daughters and a son.

FREDERICK C. MASSNICK, secretary-treasurer of the Massnick-Phipps Mfg. Company, Detroit, Mich., died December 7, aged 41 years. He was born in Flint, Mich., and learned the machinist's trade. In 1903 he organized the Horton-Massnick Company, manufacturing machinist, which later became the Massnick-Phipps Company. He leaves his widow and two daughters.

No Offering of Steel Corporation Stock to Employees

Announcement was made this week that the United States Steel Corporation has decided not to make this year its usual offering of stock for subscription by employees. This will be the first omission of the offer since this form of profit sharing was started in 1903. The unsettled condition of the steel trade and consequent uncertainty as to the earning power of the corporation were influential in leading to the decision. In January, 1914, subscriptions were received from 46,498 employees for an aggregate of 42,926 shares of preferred stock and 47,680 shares of common stock. The prices fixed at that time were $105 for preferred and $57 for common stock. It is stated that Steel Corporation employee stockholders make up nearly 40 per cent. of the total number.

It is expected that the annual bonus distribution to stockholding employees of the Steel Corporation will be omitted this year. The possibility of a reduction in salaries of officers of the corporation and the subsidiary companies and of salaried employees in all departments has also been discussed this week in connection with the meeting of presidents of the various subsidiaries which is being held in New York. The question of wage reductions at the various plants of the Steel Corporation subsidiaries also comes up as January 1 approaches. It is expected that decisions on these matters will be made this week and that there will be an announcement before the end of the year. When the formal three months' notification was given last September by the Carnegie Steel Company that some changes in its wage scales might be made at the end of the year, it was stated officially that the Steel Corporation had no intention at that time of reducing wages, but that the notice was given so that the matter could be considered later if this should be found necessary.

Benj. French, Inc., 17 Battery Place, New York, formerly 1133 Broadway, exporter of iron and steel products in all lines, requests duplicate catalogues of manufacturers.

United States Steel Corporation Exhibit at the Panama-Pacific Exposition

From a commercial standpoint, the Panama-Pacific International Exposition offers to the manufacturer and jobber a magnificent trade opportunity in the new empire west of the Rockies. It may be hard from an outside standpoint to appreciate the worth of the mighty exposition that has been built on the shores of the Pacific, but the majority of the eastern and world manufacturers have seized the opportunity to display their goods and processes of manufacture to a degree not before attempted. Especially is this true of the United States Steel Corporation and its subsidiary companies which is staging in the Palace of Mines and Metallurgy the most complete and comprehensive exhibit it has ever gotten together for display purposes.

The exhibit of the United States Steel Corporation will be the largest single exhibit in the Panama-Pacific International Exposition and is now practically complete, three months before the exposition is to open its doors. A façade of classic yet simple lines adorns the front of the exhibit space, which is nearly an acre in extent, and utilizes the entire southern portion of the Palace of Mines and Metallurgy.

IRON MINING AND LAKE TRANSPORTATION

An open pit model of the well-known Sauntry-Alpena mine is displayed. There is also a pictorial representation of the Oliver Iron Mining Company's properties. A pentagonal-sided case in the form of a pyramid is used to exhibit samples of the ores mined by the company on the five great ranges, the Gogebic, Menominee, Mesaba, Vermilion and Marquette. It is surmounted by a life-sized figure of an iron miner at work. Maps of the ranges and the locations of the properties are also shown. A model of the unloading operations at the mammoth ore docks maintained at various points on the Great Lakes adjacent to the mining operations illustrates the handling of the ore from the cars to the docks thence into the holds of the ships. Three models of the ore boats used by the Pittsburgh Steamship Company are displayed together with a large painting of the entire fleet of boats operated by the company on the Great Lakes.

H. C. FRICK COKE COMPANY

An interesting view of the operations in the mining of coal and in the quarries is shown. The display includes a full cross-section 10 ft. high taken from the Pittsburgh coal vein; a large model of a coal mine and a coking plant, together with numerous samples of coal and coke.

PITTSBURGH & CONNEAUT DOCK COMPANY

A model of the harbor at Conneaut, Ohio, and the surroundings is another feature and shows the boats being docked and unloaded, how the ore is stored in piles and then reloaded into trains for shipment to the mills. In this section is also a pictorial display of the various railroads operated by the corporation together with the types of rolling stock used. The standard types of locomotives, passenger, freight and ore cars, roadbeds and general equipment are included.

STEEL MANUFACTURING

The exhibit proper begins with the coking of coal as illustrated by a beehive coke oven model and by a model of a Kopper's by-product coke oven, together with an exhibit in a display case of coke, fuel gas and other coke oven by-products. A large display case shows the relative amounts of the component parts of a typical blast furnace charge necessary to make one ton of iron, including limestone, coke, ore, etc., also the quantity of water contained in the air of the blast. A working model of a thick lined blast furnace will prove of unusual interest to the spectator. Pig iron and blast furnace by-products as produced from the materials of the charge are exhibited.

In logical sequence from the blast furnace are shown the Bessemer, open-hearth and electric furnaces, also a steel ingot to represent the product of the steel-making furnaces. There is a model of a blooming mill and an exhibit of its products, consisting of bloom, billets, slabs, sheet bars, etc. An interesting exhibit of the various stages in the reduction of rails, beams, channels and bar mill sections is shown. There is a display of sheet-steel piling of various types, and details of driving appliances. Various reinforcing materials are shown, including a concrete floor slab with four kinds of reinforcing, two of woven wire and one of twisted and another of smooth bars, and a specimen of reinforced concrete piling. The exhibit of alloy steels and their uses is unusually complete. An interesting display of track bolts and spikes is shown in a large glass case.

There is a small testing laboratory equipped with an Olsen 50,000-lb. tensile testing machine and a spring vibrator, together with a pictorial representation of the great testing laboratories maintained by the corporation, and the various processes of testing; also a display of standard test pieces, tested and untested.

A pyramid of bar mill products consists of short length sections. There are about 600 different kinds of bars and other small sections on display which are used in the manufacture of machinery, in automobiles and in fabricated structures. A pyramid of shapes is interesting. It consists of I-beams in sizes from 3 in. to 24 in. and in weights from 5.5 lb. per ft. up to 115 lb. per ft.; angles in various sizes from 1¼ x 1¼ x ¼ in. up to 8 x 8 x ½ in., and channel sections ranging from 4 in. up to 18 in. and weights from 7.25 lb. per ft. to 90 lb. per ft.

The exhibit of steel mine timbers and a typical steel mine car will be of interest to members of the mining fraternity. An extremely interesting portion of the Carnegie Steel Company's exhibit is the pyramid of steel car wheels and the display of steel car axles shown in connection with track and railway materials. Included in the Carnegie exhibit is a complete California combination steel drilling rig, 106 ft. high, and adapted to both rotary and cable tool drilling. This rig will be erected just outside the Palace of Machinery and will be operated throughout the exposition period.

AMERICAN STEEL & WIRE COMPANY

This exhibit shows wires and their application and in sizes from the tiniest to immense cables and aerial tramway materials used in mining, hoisting and dredging; also fencing and the other classes of wire products made by this company. A rather unusual exhibit is that of fine music wires as used in pipe organ work. A splendid pipe organ with the base exposed is installed to show the location of the wires. Concerts will be given daily throughout the exposition.

UNIVERSAL PORTLAND CEMENT COMPANY

An interesting exhibit is that of the Universal Portland Cement Company which manufactures Portland cement from the slag from the blast furnaces. The exhibit is intended to typify the use of cement on the farm, in the erection of factories, residences and bridges, etc. A replica of the company's factory near Pittsburgh is shown in active operation, equipped with special illuminating details. The various processes of manufacture are detailed.

The large-sized replica of the company's factory near Pittsburgh is a mechanical contrivance called a scenograph and is electrically operated. Trains of cars are seen moving back and forth in the foreground, slag cars are run out to the dumps and a large crane of the traveling bridge type is seen in action in the background. The Universal exhibit was installed by J. A. Race of the Universal company.

AMERICAN BRIDGE COMPANY

Spanning the main aisle and opposite the archway in the façade is a transmission tower such as is used by the large power companies for carrying high-tension wires. There are also exhibited Shiffler three-legged poles used for supporting transmission lines and in trolley, telegraph and telephone line service. One of the most interesting portions of the exhibit is a 3-ft. chord section weighing 7 tons, of the Hell Gate bridge being erected by the company at New York, and it shows the fabrication of this piece of work.

There are numerous typical fabricated and plain

sections and columns showing various structures erected on the Pacific coast and elsewhere by the company. There is a section of a column used in the L. C. Smith building at Seattle, Wash., the tallest office structure on the Pacific coast; another from the Woolworth building in New York City, and various buildings of note. Models of steel barges for river and coastwise traffic are also displayed.

NATIONAL TUBE COMPANY

A complete line of Shelby seamless tubing is shown, also of National lap-welded and butt-welded pipe. One of the particular features of interest in the exhibit is a table top composed of thousands of pieces of pipe placed on end and planed to a polished surface. Pipe is shown from the smallest sizes up to a 40-ft. section. There is also a complete showing of Kewanee pipe union and other specialties.

AMERICAN SHEET & TIN PLATE COMPANY

A full line of sheet and tin mill products is shown in the popular uses of iron and steel from button stock up to railway coaches. The exhibit of stamped, spun and drawn products is unique and interesting. An Apollo farm, so called, is shown, illustrating the application of Apollo galvanized products to farm life. All the buildings, such as the house, barn, sheds, troughs, culverts, flumes and the beginnings of an irrigation system, are shown constructed of sheet metal. Sheet metal columns and standards are used about the boundaries of the exhibit space. There is also a pictorial display of the various products manufactured by the company.

MOVING PICTURE THEATER

One of the most interesting spots in the whole display is the fireproof moving picture theater seating 350 people and complete in every detail. It is a steel-covered structure and the operator's booth is especially noteworthy. In this theater is shown in detail the story of the iron and steel in every branch from the time the ore is mined until it emerges in its finished form, ready for the market. This feature will prove of great instructive value to visitors in showing the vast magnitude of the corporation's activities in the manufacturing world.

SAFETY, SANITATION AND WELFARE DEPARTMENT

The exhibit of physical, social and moral betterment is one of the most complete ever shown, and with the United States Government exhibit along the same lines, also housed in the Mines building, a new chapter, it is held by the exposition authorities, will be added to the safety and sanitation movement.

There are models of safety appliances and vital statistics. There are representations of the working conditions and the housing of the workmen and their families, their physical and social welfare and the means being taken for the betterment of the iron and steel and associated industries. Models of playgrounds, typical villages and mining towns showing correct sanitation and insanitary conditions are shown in profusion. Various appliances used in first aid and rescue work are displayed. The work of district nurses and the welfare of the children together with plans and courses for the education and instruction of the employees are indicated. A valuable portion of the exhibit is the use of motion pictures in the theater.

Practically all the furniture used in the various exhibits is metallic and manufactured from the corporation's products. A neat office structure has been erected and visitors to the section will have every convenience.

The arrangement and installation of the exhibit has been carried out by A. T. DeForest, San Francisco, as general chairman; Harry V. Jamison, Pittsburgh, as director in chief, and R. B. Woodworth, engineer for the Carnegie Steel Company, with various company representatives assisting.

At the annual meeting of the Burke Machine Tool Company, Conneaut, Ohio, December 8, officers were elected for the ensuing year as follows: G. H. Burke, president and treasurer; Harry Rockwell, vice-president; H. G. Kingdom, secretary.

RAILROAD BUSINESS MEN MEET

Sixth Annual Meeting of Railway Business Association—Interesting Banquet

The Railway Business Association, the national organization of manufacturers, merchants and engineers dealing with railroads, held its sixth annual meeting at the Waldorf-Astoria December 10. The report of the general executive committee analyzed the railroad situation at considerable length, taking a hopeful view, as follows:

We come to the end of 1914 confident that the developments of the year presage a broader and a more sympathetic public view of railway regulation. We believe this in face of perplexities, discouragements and adversity. The fundamental ground for our optimism is the apprehension expressed from almost every quarter lest our country's business may suffer harm through inability of the railroads to perform their functions adequately by reason of inadequate revenues. A climax in the transformation of popular attitude has been reached.

Resolutions were adopted urging co-ordination of the various agencies of railroad regulation; asserting general rate advance cases to be a proper subject of propaganda; vigorously dissenting from the view that the supreme concern of railroads is to avoid the risk of too much railroad revenue; advocating correction of the underpayment of railroads for carrying mail; opposing Federal regulation of railroad security issues, etc.

The election of officers resulted as follows: President, George A. Post, New York. Vice-presidents, S. P. Bush, Columbus; Alba B. Johnson, Philadelphia; H. G. Prout, New York; W. G. Pearce, New York; Walter H. Cottingham, Cleveland; W. B. Leach, Boston; E. B. Leigh, Chicago. Treasurer, M. S. Clayton, New York.

The banquet in the evening at the same place was a great outpouring of railroad officials as well as railroad business men. Nearly 1000 were present and all sections of the country were represented. President Post was toastmaster, admirably filling the exacting duties of that position. Epigrams and witty phrases caught the attention of the diners and won their frequent applause. He offered the following toast: "Here's to railroad regulation. May those who enact and those who administer the laws be as watchful of the welfare of the railroads as they are zealous in the protection of the rights of the public. Injury to either is destructive of the prosperity of both."

The formal speakers of the evening were Fairfax Harrison, president Southern Railway Company, and Senator-elect Warren G. Harding of Ohio, both of whom greatly pleased their auditors. Speaking of the railroad situation, Mr. Harrison said: "The existing system of irresponsible, rigid and divided regulation cannot permanently endure. My present purpose is not to venture to suggest the solution but the source from which an acceptable solution must come. . . . The problem is a statesman's opportunity. He who solves it must be trusted by all the people. He must be above the suspicion of selfish motive. I venture to suggest that the present President of the United States is equal to this great achievement. The time seems ripe for him to undertake it."

In the course of his address, Mr. Harding said: "I believe that the day of plundering financing has passed. I should like to proclaim, in the same breath, the passing of railroad baiting less inspired by public good than by personal profits and political gain. It has been a great stunt to hammer the railroads. The drift is toward the sober, second thought. There has been an excess of commissioning. I believe it is the opinion of 99 of every 100 thinking people that the railroads are entitled to an increase of rates, and would gladly see it granted. Joseph proclaimed the warning to lay by an abundant store during the seven fat years in order to be prepared against the seven lean years. Egypt prospered wonderfully thereby. The wisdom of Joseph holds good to this day. American railroads ought to be able to earn enough in the fat years to be prepared to carry on their vast improvements in the lean years which inevitably come."

The Machinery Markets

Reports containing good features, especially regarding the export trade in machine tools, continue to come from the principal manufacturing cities. The domestic demand shows slow improvement, but it is not so widely distributed as is usual in normal times. The trade with belligerent nations is notably good from New York indications, while the domestic demand is a little better. Detroit does not make as good a showing as last week, though a fair run of single-tool orders is reported. In Cleveland the foreign demand for automatic screw machines is especially heavy, one company having sold 42 in 10 days, but the demand for standard tools is moderate and general manufacturing shows but little improvement. Business is on the mend in Cincinnati, the foreign demand is good and jobbing foundries who serve machine tool makers are rushed with work, though some makers of machinery are not sharing in the betterment. In Chicago inquiry is improved and the outlook is for greater activity in the early part of 1915. Scattered orders for machine tools have been received in Milwaukee, inquiry is increasing, agricultural implement foundries are busy and the general indications point to better business. In the Central South sentiment is optimistic, but actual transactions are not large. Conditions in Texas are unusually dull. Inquiry continues promising in St. Louis, otherwise no improvement is shown, but the maintenance of 60 per cent. of activity is considered encouraging. In the Pacific Northwest agricultural and miscellaneous equipment are selling well despite a tendency to withhold important buying until after the holidays.

New York

NEW YORK, December 16, 1914.

The domestic demand for machine tools has improved, but it is yet far from being brisk. The buying for export is heavier than ever, a fact which locally is evident, despite the placing of most of the orders direct with manufacturers. Some excellent export propositions are pending, but most of them are at a stage which precludes publication in detail at this time. Dealers are getting some, but not a great deal of this business. One exporting house in this city is sending a great many machines abroad, principally turret lathes and automatics. In some cases buyers for foreign governments obtained options on manufacturers' stocks, but these were made subject to prior sale, and if a conclusion to buy is reached, not all the machines wanted can be promptly shipped. An eastern locomotive works has been getting figures from other concerns on timers and fuse parts for shrapnel and inasmuch as it is known to have been contemplating the making of the shrapnel cases, itself, the probabilities are that it is about to close a contract with one of the foreign governments.

The Eveland Engineering & Mfg. Company, Philadelphia, confirms a report that it has received a contract from agents of two of the allied powers for shrapnel cases. The total order, according to a statement by S. S. Eveland, will amount to $1,000,000. It will be undertaken in installments, the first of which will represent an expenditure of about $1,250,000. The company announces that it has let contracts for heat treating, case-hardening, tempering and steel cementation furnaces capable of handling 30,000 lb. of steel daily. The contracts call for completion January 1 and will provide the largest plant of its kind in or near Philadelphia. Steel weighing several thousand pounds can be handled. Included in the plant are electric and gas furnaces, pyrometers and annealing ovens.

The disastrous fire which inflicted heavy damage on the plant of Thomas A. Edison, Inc., West Orange, N. J., did not do as much damage to the machinery contained in the buildings as was thought at first. The new machine shop contained hundreds of thousands of dollars worth of machine tools and a part of these, except where the fire was most severe, or floors collapsed, can be salvaged. Lines of shafting which were suspended in hangers attached to steel strips also escaped serious damage. It is believed that 95 per cent. of the machinery and tools that were in the buildings can be repaired and made serviceable again.

The Buckeye Engine & Foundry Company, Joliet, Ill., informs *The Iron Age* that it will soon be in the market for a horizontal cylinder-boring machine and will furnish blue prints or the cylinders to those who manufacture machines of the type wanted.

The Oscar Trilsch Company, Whitestone, Long Island, N. Y., manufacturer of jewelry cases, has increased its capital stock to $235,000 and contemplates the erection of a factory adjoining its present plant. Louis O. Trilsch is president.

The Calculagraph Company, 9 Maiden Lane, New York, has awarded the contract for the erection of a two-story reinforced concrete factory, 50 x 100 ft., at Third and Sussex streets, Harrison, N. J., at a cost of $25,000. Henry Abbott is president.

The Defiance Button Machine Company, 53 East Eighth street, New York, is building a one-story brick addition to its factory in Long Island City, 25 x 61 ft., of brick construction, to cost about $4000.

The chamber of commerce, Perry, N. Y., has arranged with a new company incorporated with a capital stock of $25,000 by G. M. Traber, J. N. Wyckoff, W. T. Olin, C. F. Eaton and C. A. Carmichael, which proposes to invest about $40,000 in a manufacturing plant.

The Endurance Tire & Rubber Company, 1789 Broadway, New York, has awarded the contract for the erection of two factory buildings, one 80 x 252 ft., and the other 35 x 37 ft., to be built at the foot of Fulton street, New Brunswick, N. J. W. G. H. Randolph is in charge.

The Auburn Woolen Company, Auburn, N. Y., has let the contract for the erection of a five-story and basement addition 80 x 120 ft. T. W. Clarke is president.

William Baker, Birr avenue and Raines Park, Rochester, N. Y., will erect and equip a machine shop 33 x 85 ft., at 621 Oak street, Rochester.

The board of village trustees, Sheridan, N. Y., is taking bids for an addition to the waterworks pumping plant. Ernest Wilder, Fredonia, N. Y., is the architect.

The Morrow Mfg. Company, Elmira, N. Y., is having plans drawn for a factory of sawtooth type to cost about $125,000. A. P. Morrow is president.

The Syracuse Bridge Company has contract for building a three-story factory for the Penman Littlehalos Company, Spring street and Canal Basin, Syracuse, N. Y.

The Ross Food Company, Buffalo, N. Y., recently incorporated, is preparing plans for a factory. Alexander Ross, 945 Ellicott Square Building, Buffalo, is president.

Chicago

CHICAGO, ILL., December 14, 1914.

Encouragement to be derived from the developments of the machinery market last week is largely based on a noticeably improved inquiry. Not only is there a more general inquiry for manufacturing tools for industrial plant equipment, but several of the railroads have in a very tentative way inquired for prices on possible machinery requirements in the coming year. For the first three months of the new year there is now a much more tangible prospect for a satisfactory volume of business. One of the unsatisfactory features of current inquiry arises from the very general desire to trade in old machines for new as against outright cash purchases. While the market recently has been more active for second hand than new tools, the necessity where a trade is involved of selling not only the new machines but the old equipment that is taken in before much cash can be realized from the transaction diminishes the attractiveness of much of the business in sight rather more just now than usual. Some additional orders from European countries have been placed in this market recently, including a further order for turret lathes and several high speed metal saws for use in shipyard and fabricating shops. Miscellaneous inquiry for second hand equipment including lathe, shaper and drill is noted.

The Western Chandelier & Electrical Construction Company, Chicago, has incorporated with a capital stock of $10,000 to manufacture and deal in electric motors and other electrical and mechanical specialties. Incorporators are Harold J. Finder, 117 North Dearborn street, Samuel Woskow and Jennie Shapiro.

The Edwards Lighting Fixture Company, Chicago, has been incorporated with a capital stock of $25,000 to manufacture and deal in gas and electric fixtures, etc. Incorporators are Leo J. Georgen, 1654 South Homan avenue, John L. Cushing and L. V. Hult.

Woodward & Branson, Chicago, have incorporated with a capital stock of $10,000 to manufacture and deal in automatic sprinkler equipment. The incorporators are W. G. Branson, Clarence C. Green and W. H. Engleman.

N. & Paul Pierce will erect a one-story brick manufacturing plant, 116 x 176 ft., at 232-248 North Ashland avenue. The architects are Mahler & Cordell; builders, Stoddard Construction Company.

Theodore Steuben is preparing plans for a one-story factory, 65 x 130 ft., to be erected on South Hoyne avenue, Chicago.

The Hardstone Brick & Tile Company has acquired from the Chicago Clearing Land Association 45,000 sq. ft. of land at Sixty-sixth street and Fifty-ninth avenue, 96 x 475 ft., at approximately 12½c. per sq. ft. There will be constructed upon this a 4-story brick and concrete factory, 75 x 300 ft., and a two-story office building, 25 x 75 ft. The land has switch track connections with the Belt Railway of Chicago and the Clearing Yards.

The National Mfg. Specialty Company, Chicago, has been incorporated with a capital stock of $50,000 by D. F. Livesay, V. P. Sherwin and W. F. Atchison.

The Trinity Belt Mfg. Company, Chicago, has been incorporated with a capital stock of $10,000, by Michael L. Igoe, 69 West Washington street, Thomas Lindskog and Elmer J. Whitty.

Mundie & Jensen have finished plans for a four-story factory, 100 x 65 ft., to be erected for the Newberry Library at 212 to 216 West Austin avenue. It will be occupied by the Reliance Elevator Company and will cost about $50,000.

The Edwards Mfg. Company has broken ground for its new plant in East Chicago and expects to have the first unit completed by February 1. The Chicago plant will be moved to East Chicago in its entirety. The product is to be high pressure steam fittings.

The Portable Elevator Company, Bloomington, Ill., has plans for a large addition to its plant which will include a warehouse, factory building and a smaller one-story structure. The additions will give the company 125,000 sq. ft. of floor space.

The Galesburg Machine Works, Galesburg, Ill., has commenced improvements estimated at some $8500 and expects to finish building operations next spring. An addition to be used for a store room and machine shop is already well on its way to completion and the second story to the old building, which is not yet started, will be used for automobile show rooms.

The Leggett & Platt Bed Spring & Mfg. Company will commence operations in Waukegan, Ill., about the first of the year. If present plans are carried out the company will discontinue its Louisville and Carthage plants and concentrate work in Waukegan, which would mean that the plant would be enlarged.

The Kohler Die & Specialty Company, Chicago, will move its plant to DeKalb, Ill., and build a new modern factory building which will have about 30,000 sq. ft. of floor space. The company manufactures hardware specialties.

The Consumers Ice Company will begin immediately an addition to its plant at Rockford, Ill. The plant will be enlarged to take care of the equipment and machinery of the former Peoples Company plant, which has been operated by the Consumers Company.

An item in *The Iron Age* issue December 3 referring to the McKinney Tractor Company, Belleville, Ill., should read the McKinney Tractor Cultivator Company. It is in the market for structural steel, metal sash, etc., for a factory it is erecting, 80 x 200 ft.

The Anchor Concrete Stone Company, Rock Rapids, Iowa, manufacturer of cement block machinery, automatic tampers, etc., plans to start a small foundry for its own use, and will need only a cupola, blower, electric motor, and rattler. C. W. Bradley is general manager.

Fire damaged the Missouri Pacific Railroad roundhouse at Horace, Kan.

The Western Mfg. Company, Oskaloosa, Iowa, is making an extension to its buildings.

The pattern building of the Great Western Mfg. Company, Leavenworth, Kan., was recently destroyed by fire. The building was filled with patterns for mill machinery and the estimated loss is about $15,000.

The C. O. D. Gas Tractor Company, Crookston, Minn., has been incorporated with a capital stock of $1,000,000. It does not plan to build until next year and will not be in the market for machinery for some time. A. O. Espe is president; W. T. Clapp, vice-president, and Helmar Ogard, superintendent.

Indianapolis

INDIANAPOLIS, IND., December 14, 1914.

The Pavey Electric Company, Indianapolis, Ind., will place orders in January for the following machine tools for its new plant at Dunbar, near Charleston, W. Va.:

One 24-in. planer.
One 24-in. x 12-ft. lathe.
One 18-in. x 8-ft. lathe.
One 18-in. x 10-ft. lathe.
One 16-in. x 6-ft. lathe.
One 16-in. x 8-ft. lathe.
One 30-in. vertical boring machine.
12-in. and 16-in. shapers.
14-in. to 28-in. drill presses.
Punching and notching presses.
No. 2 milling machines.
Cylindrical grinders.
Surface, tool and drill grinders.
Small tools and supplies.
Complete brass foundry equipment.

Catalogues and quotations should be addressed to Frank H. Pavey, 204 Castle Hall, Indianapolis, Ind.

The Kokomo Foundry & Machine Company, Kokomo, Ind., is not in the market for any equipment at the present time. It has arranged to have its stoker manufactured by an associated foundry.

Milwaukee

MILWAUKEE, WIS., December 14, 1914.

The first half of December is showing an appreciably larger volume of business than probably any bi-weekly period of this year. The improvement which set in several weeks ago is being accelerated slowly but surely. Machine-tool builders report a few scattering orders on domestic account and are encouraged by the fact that inquiries are increasing and point to heavier buying after January 1. Foundries making agricultural machinery and implement castings are increasing their productions. There is an absence of demand for prime movers and power equipment; but some business in this line is due to break soon. Payrolls show an increase for the week and the situation of the unemployed is improved by reason of the extension of working forces and working hours. Wood-working machinery is in better demand. The issue of building permits in Milwaukee shows good gains after a long period of decreasing volume.

The Bay Iron Works, Bayfield, Wis., is planning to manufacture a patented hoist, operated by gasoline engines, for construction, stump-pulling and general industrial purposes. The shop equipment is to be increased this winter.

The Jersild Fire Escape Company, Neenah, Wis., has been incorporated with $100,000 capital stock by J. N., N. C., Evald and Holgar Jersild. For the present it will have its product built on contract, later establishing its own plant.

The C. F. Kade Fixture & Showcase Company, Plymouth, Wis., is having plans made for two shop buildings which it will erect this winter at a cost of about $25,000. It has increased its capital from $35,000 to $75,000.

The Waukesha Spring Water Ice Company, Waukesha, Wis., has been incorporated by C. E. Armin, Charles Baxter, J. S. Hoffman and R. J. Gaul with a capital stock of $50,000, and will establish an artificial ice making plant.

The Wisconsin Veneer Company, Rhinelander, Wis., has been reorganized and the capital increased from $40,000 to $75,000. The plant, which has been idle for some time, will be overhauled, machinery rearranged, new equipment added and operations resumed about January 1. John O. Moen is president, and F. A. Marshall, general manager.

The Western Iron Works, Manitowoc, Wis., has changed its title to Grimm Aluminum Castings Company and plans to limit its foundry to aluminum castings exclusively. Roland Grimm is general manager.

The Citizens' Association, Manitowoc, Wis., is making a canvass for funds for the construction of a machine shop for the Atlas Mfg. Company, Milwaukee, manufacturing concrete mixers, which will move to Manitowoc if this condition is met.

A committee of stockholders has been appointed by D. G. MacMillan, trustee of the Hans Motor Equipment Company, La Crosse, Wis., to raise $25,000 in cash to preserve the industry. To facilitate the sale of the company's products, the Hans Sales Company, with $10,000 capital stock, has been incorporated by Edmund E. Hans, George and M. J. Hedding. The concern furnishes automobile manufacturers with gauges, pressure pumps, etc.

The Silent Washer Mfg. Company, 721 Superior street, Appleton, Wis., manufacturer of wood and metal power and hand washing machines, is planning to erect a plant which will permit of three times the present output. Definite plans will not be made until next spring. A. E. Knueppel is secretary.

The T. S. Wheel & Mfg. Company, Milwaukee, Wis., is about to start its regular production of ball-bearing, resilient wheels for automobiles and is finishing the equipment of its plant. T. S. Smulski is chief engineer.

The board of education, Cudahy, Wis., is taking bids for the equipment of a public school containing a manual training department, to cost $60,000. R. A. Messmer & Bro., Milwaukee, are the architects.

Milwaukee, Wis., has disposed of an issue of $60,000 in bonds for the erection of a natatorium. Fred G. Simmons is commissioner of public works.

C. H. & E. Mfg. Company, Mineral street, Milwaukee, Wis., manufacturer of contractors equipment, etc., will not be in the market for machinery for its new plant.

F. E. DeWilde, Sheboygan, Wis., has organized the Flexo Cuff Link Company with $2000 initial capital, to manufacture and market a new type of metal cuff-link and other similar articles. William K. and Frederick Braasch are associated with him.

Cleveland

CLEVELAND, OHIO, December 14, 1914.

Foreign demand for automatic machinery continues active. One Cleveland company has taken several orders aggregating 42 machines for export during the past ten days; and its stock is being rapidly cleaned out, some sizes being already exhausted. The question of delivery has become an important factor, as immediate shipment is required on export orders. New foreign inquiry is still plentiful. Machinery dealers report a moderate domestic demand for standard tools, orders being nearly all for single machines. Some additional business has been placed by an Ohio automobile plant, which is expected to make further purchases. Makers of automobile parts are fairly busy. General conditions in metal working plants show little, if any, improvement.

The Ohio Naval Militia, 408 Federal Building, Cleveland, is in the market for a 14-in. lathe, 15-in. shaper and a grinder for the naval training ship Dorothea.

The B. F. Goodrich Company, Akron, Ohio, will erect a two-story factory. The Burger Iron & Steel Company has the contract for the steel work.

The Alloy Foundry Company, Akron, Ohio, has been incorporated with a capital stock of $1000 by S. C. Gresham, E. F. Kibbler, and others.

The Summit Iron & Steel Company, Akron, Ohio, has been incorporated with a capital stock of $10,000 by H. A. Blair, A. M. McNair, F. L. Carpenter, and others.

The Central Machine & Tool Company, West Toledo, has been incorporated with a capital stock of $20,000 by Leonard Banreth, George Manns, and others.

The Everhard Mfg. Company, Canton, Ohio, maker of electrical appliances, metal specialties and novelties, is planning to double the capacity of its present plant.

The Bucyrus Implement Company, Bucyrus, Ohio, has placed a contract for the erection of a factory and storage house 50 x 150 ft.

It is announced that the Lake Shore & Michigan Southern Railroad Company has completed plans for a $200,000 roundhouse and repair shop at Coalburg, Ohio, work on which will start soon after the first of the year.

The C. Hines & Sons Mfg. Company, Napoleon, Ohio, has commenced the erection of factory additions that will increase its floor space 5000 sq. ft. It will add some new products to its present line of galvanized goods.

The International Cut Glass Company will move its plant from Buffalo, N. Y., to Warren, Ohio, where it will occupy a portion of the Day-Ward plant.

Edward C. Fox, Marion, Ohio, and others, are planning to establish a plant for the manufacture of cyclecars, automobile accessories and other products.

The Columbus Chain Company, Columbus, Ohio, is planning to enlarge its Lebanon, Pa., plant by the erection of a brick addition 40 x 150 ft. At present only shovel and dredge chains are made at the Lebanon plant, but it is the intention to make a complete line of chain in the plant as soon as the extension is completed.

A pipe line, with pumping plants, etc., will be equipped, running east from the Mississippi to tidewater by the Illinois Pipe Line Company, Findlay, Ohio, which has been incorporated with a capital stock of $20,000,000 by J. R. Penn, Jr.; W. E. Badger and J. E. Herr, Ward A. Miller, Lima, Ohio, and M. W. Porter, Marshall, Ill.

The new Shuey Factories Building, Springfield, Ohio, is now nearing completion. A number of manufacturing concerns have already secured space in it.

Cincinnati

CINCINNATI, OHIO, December 14, 1914.

With few exceptions business in manufacturing circles is conceded to be on the mend. Foreign orders have filled in the gap that usually precedes the dull inventory season. Quite a number of machine-tool builders in this vicinity have enough business already in hand to keep them running until March 1. While it was generally thought that the European demand for machine tools was at least temporarily satisfied the past week's record indicated that this surmise was not correct. Several inquiries were received last week, included in which was one from Russia for a large number of lathes. It is now believed that the export trade will keep most of the machine-tool companies busy until well along into the spring, when domestic business is expected to open up in good volume. There is practically no demand for shapers from any source. Wood-working machinery is also quiet.

The jobbing foundries, making a specialty of machine-tool castings, are rushed with work, and quite a number of contracts have been placed with outside foundries. Second-hand machinery, of all kinds, is slow; but a few deals for power-plant equipment are reported as being under way.

The Cincinnati Iron & Steel Company, Cincinnati, reports the receipt of three foreign orders for Cisco lathes during the past 10 days. Domestic business also shows some signs of improvement.

The Cincinnati Steel Furniture Company, Railroad and Erchenbrecher avenues, Cincinnati, has been incorporated with $25,000 capital stock by E. H. Schriefer, M. W. Seifert, S. G. and L. J. Backman and E. G. Schriefer. It has fitted up a new factory 100 x 200 ft., one story, of brick construction; and is engaged in the manufacture of steel metal furniture, including factory lockers. All machinery has been bought.

M. R. Carpenter, refrigerating engineer, Pickering Building, Cincinnati, has prepared plans for an addition to the packing plant of Maescher & Co., Cincinnati. Contracts for ice-making equipment will be let at an early date.

E. H. Jungclas, Reading and Paddock roads, Cincinnati, has let the contract for a large public garage, in which will be installed a small repair shop.

It is reported that the Loveland Ice Company, Loveland, Ohio, contemplates making further additions to its plant. Details are not yet available.

The Dais Brick Company, Athens, Ohio, is a new company organized to erect a large brick plant. Benjamin Dais is one of the principal members.

The United States Sheet Metal & Culvert Company, New Boston, Ohio, will establish a branch plant at Savannah, Ga.

The Wooster Shale Brick Company, Wooster, Ohio, has increased its capital stock from $150,000 to $250,000, and will make some additions to its plant at an early date.

Wooster, Ohio, will soon advertise for bids on a filtration plant, estimated to cost $140,000. Max Bloomberg is service director.

George R. Curd, Merchants' Building, Cincinnati, Ohio, is in the market for a 10 x 12 double-cylinder mine hoist for delivery at a Kentucky coal mine.

Detroit

DETROIT, MICH., December 14, 1914.

The improvement in the machine-tool market noted last week is not so apparent this week, although the market is by no means stagnant. A fair run of single tool orders has been reported. The growing movement in the city of "Detroit First" is noticeable in the employment of men of established local residence in the manufacturing plants and by the preferential placing of orders with Detroit factories. Among the most important orders was that given to the American Car & Foundry Company for a large amount of pipe for municipal uses. A disappointing feature is the almost entire absence of new companies coming into the manufacturing field. Money is still tight and construction work is suffering in consequence.

The plant of the National Concrete Stone Company, Detroit, was destroyed by fire December 8, entailing a loss of $15,000. It manufactured concrete products.

The Brown-Morris Company, Detroit, has been incorporated with $10,000 capital stock to manufacture iron and

steel specialties. The incorporators are George W. and Irvin J. Brown and William E. Morris.

The Kalamazoo Vegetable Parchment Company, Kalamazoo, Mich., manufacturer of special papers, announces that it will erect a building, doubling the size and capacity of its present plant. Considerable machinery will be required.

The Calumet Car Company, Calumet, Mich., recently organized, is making preparations for the manufacture of mine dump cars. John Karhu, V. D. Simar and M. C. Harrington are among the stockholders.

The Central South

LOUISVILE, KY., December 14, 1914.

While sentiment generally is more optimistic than it has been, the amount of business actually transacted is not large, and the impression prevails that the demand for machinery will not be active until after the holidays. Indicating the state of trade, cotton mills in the South are considering a two weeks' shut-down during the Christmas holidays. Many manufacturers will close their plants Friday and Saturday, December 25 and 26. The business which has been handled has provoked warm competition, and prices have been unusually low. Electrical power equipment is probably in best demand at present, but no line of special machinery is particularly active.

The Ford Motor Company, Detroit, Mich., has announced that work on an assembling plant at Third and H streets, Louisville, will be begun soon.

John Ogle, Inc., is the style of a concern incorporated by Janet G. Ogle, Louisville, and others, with $5000 capital stock to manufacture beer pumps.

The Up-to-Date Milling Company, Harrodsburg, Ky., plans the establishment of a flour mill with a capacity of 50 bbl. a day. William Smock is in charge.

R. R. Perry, Winchester, Ky., has purchased 1000 acres of timberland near Annville, Ky., and will establish a sawmill.

Tipple No. 2 of the West Kentucky Coal Company, Sturgis, Ky., which was burned last week with a loss of $20,000, including the power and other machinery, will be rebuilt.

A new buyer of machinery and supplies is the Ashless Coal Company, Lothair, Perry County, Ky., which is just beginning the operation of a large mine.

George M. Adams, Sandlick Creek, Ky., and others will establish a saw and planing-mill at Whitesburg, Ky., early in 1915.

The Hoge-Montgomery Company, Frankfort, Ky., a woodworking concern, has purchased an additional building and is reported to have plans for equipping it.

The Blane Motor Car Company, Cadiz, Ky., plans to equip a garage.

The Soldier Clay & Asphalt Company, Soldier, Ky., has been incorporated with $55,000 capital stock to develop a mineral deposit. Alva Sanders and S. M. Bradley are the incorporators.

Jacob H. Hauther and Charles A. Fuhrer, Evansville, Ind., will build a plant for the construction of steamboats.

The New Albany Mfg. Company, East Tenth and Water streets, New Albany, Ind., which makes stone-working equipment, has issued $30,000 of bonds for the purpose of expanding its business.

The Seymour Harness Company, Seymour, Ind., which has received an order for military supplies amounting to $200,000, is preparing to enlarge its factory.

Memphis, Tenn., plans the establishment of a plant for creosoting timbers used in bridge construction work. George C. Love, commissioner of streets, is in charge.

Victor Bentner, Kansas City, Mo., who, as recently reported, is interested in a proposed cement mill at Cumberland Gap, Tenn., is connected with the Lumbermen's Cement & Brick Company.

McMinnville, Tenn., plans to build a water-power plant on Collins river to operate the waterworks. Claude W. Pearsall is superintendent.

The Murfreesboro Water Company, Murfreesboro, Tenn., plans the construction of a pumping station and the development of additional water supply. James E. Jetton is president.

The Penn Window Glass Company, Pennsboro, W. Va., is in the market for engines, pumps and other equipment. Raymond Comil is president.

A. E. May, Barboursville, W. Va., is in the market for a 50-hp. gas engine. A used machine will be considered.

Houston & Liggett, Columbia, Tenn., are reported to plan the establishment of a slat mill at Chapel Hill, Tenn.

The Evansville Brewing Association, Evansville, Ind., has begun the construction of an ice factory, to cost without equipment about $17,000.

Texas

AUSTIN, TEXAS, December 11, 1914.

The past week was marked by extraordinary dullness in the machinery and tool trade, due chiefly to the near approach of the holiday season. Prospects for a general revival of business early in the coming year are considered good.

L. C. Acres, Austwell, Texas, plans to construct a planing mill at Texas City. The machinery will be electrically driven.

Steps have been taken by the land owners around San Benito to create an irrigation district to embrace about 70,000 acres of land. Bonds amounting to $650,000 will be issued, and of this sum $350,000 will be used to purchase the irrigation system of the San Benito Land & Water Company and the remainder for making improvements.

The municipal waterworks plant at San Angelo is to be equipped with a pump of 3,000,000 gal. per day capacity.

The Uvalde Water Works Company, Uvalde, will make improvements to its waterworks plant.

It is announced by F. G. Sykes, president of the American Power & Light Company, 71 Broadway, New York, that its subsidiary, the Texas Power & Light Company, Dallas, will expend from $500,000 to $1,000,000 in improvements and enlargements of its power plants in this State, and in the building of transmission lines.

The Austin Gas Light Company, Austin, has increased its capital stock from $450,000 to $500,000 to provide for improvements.

St. Louis

ST. LOUIS, MO., December 14, 1914.

An interesting number of tentative inquiries for machine tools continue to come out, but with no developments in the way of actual transactions. These are being held off until after the end of the month, if not longer. Purchases which are being made are altogether for imperative needs. The aggregate of business is not falling any lower, and this is in itself an encouraging sign. Reports from the cotton section of improved conditions continue. Dealers therefore remain hopeful. Second-hand tools are showing a slight improvement in demand and new equipment sales are running about 60 per cent. of normal.

The Pioneer Box Company, Crawfordsville, Ind., has decided to establish a plant at St. Louis. Edward E. Eames is president. Wire bound boxes are the output and new equipment will be bought.

The Norris Grain Company, Kansas City, Mo., has been incorporated with a capital stock of $200,000 by Frank C. Hoose, R. A. Kelly and A. Huttig.

The Tombigbee Lumber Company, Kansas City, Mo., has been incorporated with a capital stock of $15,000 by C. T. Goble, George A. Neal and M. E. Ramey.

The La Plata Light, Heat & Ice Company, La Plata, Mo., will install additional equipment, including generator, etc.

The Missouri Gas & Electric Service Company, Lexington, Mo., has plans for changing its electric system from 1100 volts, single-phase to 2300 three-phase, and installing one 350-kw, three-phase generating unit, direct-connected.

The Louisiana Light, Power & Traction Company, Louisiana, Mo., will install one 16 x 36-in. Corliss engine, belted to a 120-kw. revolving field generator.

An electric light and power plant will be equipped at Huntsville, Ark., by Frank Barr, Fayetteville, Ark., who has obtained a franchise.

The Delta Mfg. Company, Stuttgart, Ark., has been incorporated with a capital stock of $10,000 by R. P. Robbins, C. M. Cox and Clarence Lanhon, and will equip a manufacturing plant.

A handle factory of undetermined capacity will be equipped at Leslie, Ark., by W. C. Shain, who is seeking bids on equipment.

The Holderman Timber & Mfg. Company, Strang, Okla., has been incorporated with a capital stock of $15,000 by J. M. Simmons, Morris, Okla.; H. C. Holderman and E. V. Simmons, and will establish a plant for the manufacture of hardwood and softwood barrel staves, hoops, charcoal, etc.

The Tilton Mfg. Company, Oklahoma City, Okla., has been incorporated with a capital stock of $10,000 by W. Rucker and Charles Hoopes, Oklahoma City, and M. Tilton, Watson.

The Bartlesville Monument & Cut Stone Company, Bartlesville, Okla., has been incorporated with a capital stock of

$15,000 by G. C. Loomis, Bartlesville; W. A. Leston and H. H. Parrett, Dewey.

The Steel Tank Builders of America, Drumright, Okla., has been incorporated by W. F. Borcham, D. V. Kelley and J. W. Philip.

The Glenn Pool Pipe Line Company, Tulsa, Okla., has been incorporated with a preliminary capital of $25,000 by E. R. Perry, R. R. Poe and M. Diekerman.

The Acme Pipe & Foundry Company, Fifth and Blackwelder streets, Oklahoma City, Okla., is in the market for foundry and machine-shop equipment. M. K. Weizel is president.

The City Commissioners, Muskogee, Okla., will purchase generators for the power plant of the municipal pumping station.

The Gibbon Cheese Company, Gibbon, Okla., has been incorporated with a capital stock of $20,000 by Sherman Crouse, N. B. Thomas, R. R. Smith and W. P. Rogers. It will equip a factory, including power plant, presses, etc.

Afton, Okla., will expend about $30,000 on a sewage system and disposal plant. The Benham Engineering Company, Oklahoma City, Okla., is in charge.

Vivian, La., will expend $25,000 upon a waterworks plant for which bids are to be received at once. The mayor is in charge.

The Johnson Ice & Light Company, Winnfield, La., has been incorporated with a capital stock of $19,000 by J. M. and J. E. Johnson, and others, and will equip an ice and an electric light plant.

The Moore Rotary Stump Cutter Company, 213 Hennen Building, New Orleans, La., capitalized at $40,000, is in the market for equipment for the manufacture of a patented stump-cutting machine with power traction. P. S. Schneidau is president, and Ambrose L. Moore, manager.

The William Garrigue Company, Amesville, La., will remodel and re-equip a plant in disuse to distil fatty acids from cotton seed stock and also refine glycerine. William Garrigue is president.

The Pacific Northwest

SEATTLE, WASH., December 8, 1914.

The heavy movement of grain to Europe is still the outstanding feature of the Pacific northwest. This has greatly relieved the financial situation, and, with preparations for an increased acreage, has caused a very fair demand for agricultural and miscellaneous equipment. The outlook for lumber also is improving somewhat, and a gradual resumption of work is taking place in the copper mining sections. The tendency to postpone important orders until after the holidays is quite general, but small orders in several lines are coming out more freely. A new steamer connection opened between Puget Sound and Vladivostok is handling heavy cargoes, including a lot of electrical machinery on the first steamer; and it is expected that a great deal of mill machinery, implements, etc., will go by this route.

The Staub Pulp, Paper & Lumber Company, Spokane, Wash., plans the establishment of a pulp and lumber mill in Libby, Mont., the conversion of the buildings of the Panhandle Brewing Company, at Coeur D'Alene, Idaho, into a paper mill, etc. The company is composed of Spokane capitalists and has a capitalization of $4,000,000.

The Mackie Mill & Mercantile Company, Gettysburg, Wash., will erect a shingle mill of 200,000 shingles per day capacity near New Westminster, B. C. It is in the market for machinery.

The Empire Mfg. Company, Spokane, Wash., and the Pendleton Iron Works, Pendleton, Ore., will consolidate for the purpose of manufacturing rotary pumps, iceless refrigerators, split wood pulleys and other patented articles. The new company will be capitalized at $125,000 and the factory will be located in Pendleton.

The Henninger & Ayes Mfg. Company, Portland, Ore., recently incorporated with a capital stock of $20,000, by W. A. Henninger, M. M. Ayes and E. W. Spiegel, to manufacture and sell various kinds of machinery. Offices will be maintained at 47 First street, Portland.

The American-Hawaiian Fruit Canneries Company, Hoge Building, Seattle, of which A. S. Peterson is president, will build a $200,000 by-products plant in North Yakima, Wash.

The Willamette Pulp & Paper Company and the Crown-Columbia Paper Company, both of Oregon City, Ore., estimated value $1,000,000, have been merged, and it is reported that immediate improvements will be made.

The Helena Milling Company, Helena, Mont., recently incorporated with a capital stock of $50,000, is preparing to establish a flour mill. C. G. Evans, P. B. Bartley, Z. T. Vinson, R. C. Wallace and H. A. Thurston are the directors.

The Great Northern Railroad Company will build a 5000-ton ice plant in Wenatchee, Wash.

Edgar Hafer, Medford, Ore., contemplates the construction of a saw mill and box factory, of 50,000 ft. per day capacity, to cost $100,000. It is understood the plant will be built early in 1915.

R. M. Jennings, manager of the Oregon Power Company, North Bend, Ore., backed by eastern capital, contemplates the construction of a briquetting plant in this city. The plant will be established early in 1915.

The Wahkiakum Timber Company, Portland, Ore., has been incorporated with a capital stock of $300,000. It will develop timber holdings.

The Snoqualmie Falls Lumber Company, Tacoma, Wash., has selected a site for a cedar mill near Snoqualmie Falls. A large cargo mill will also be built on Puget Sound; but it is announced that the mills will not be built until lumber trade conditions are better.

The Western Union Mines Company, organized by J. L. Barber and E. D. Reiter, Republic, Wash., is taking figures for the construction of a power plant, to include two 500-hp Diesel type engines, direct connected with generators.

The Walla Walla Hot House & Vegetable Company, Walla Walla, Wash., plans a greenhouse to be equipped with a gravity steam-heating system, etc., at a cost of $40,000.

Western Canada

WINNIPEG, MAN., December 6, 1914.

Tenders for the construction of the mill and machinery for the Western Builders, Investments & Loans, Calgary, Alberta, have been called.

Additions will be made to the plant of the Redcliffe Rolling Mills, Redcliffe, Alberta. The company will install machinery for the manufacture of nuts, bolts, washers and spikes, and will also install a complete glazing plant. Mr. Husband is manager.

The ratepayers of West Vancouver, B. C., passed a by-law to grant $150,000 for extensions to be made to the waterworks plant and system.

The plant of the Western Canada Cordage Company, Ltd., Calgary, Alberta, will be 160 x 400 ft., and not 140 x 160 ft., as has been reported.

Eastern Canada

TORONTO, ONT., December 12, 1914.

The Walkerville Roofing Mfg. Company, Ltd., Walkerville, Ont., has been incorporated with a capital stock of $60,000 by L. H. Cheeseman, J. T. Sullivan and others, and F. C. Kerby, Windsor, Ont.

The Heliotype Company, Ltd., Ottawa, Ont., has been incorporated with a capital stock of $50,000 by A. E. Shaw, Robert G. Code, Edmund F. Burritt and others, to manufacture paper box board, paper boxes, envelopes, etc.

The United Gas & Fuel Company, Ltd., Hamilton, Ont., has increased its capital stock from $500,000 to $1,000,000.

The McFarlane Wagon Company, Ltd., Naskwaakis, N. B., has been incorporated with a capital stock of $20,000 to manufacture wagons, etc.

W. R. McCloskey, Ltd., Boiestown, N. B., has been incorporated with a capital stock of $40,000 to manufacture lumber, etc.

It is announced that the Electro Metals, Ltd., Welland, Ont., will make large additions to its plant and will install new furnaces.

The Crystal Cut Glass Company will erect a factory at Ft. Erie, Ont. William E. Hunt, Ft. Erie, is one of the principal stockholders.

The Canadian General Electric Company will spend $150,000 on plant and equipment to manufacture railway cars at Peterboro, Ont.

Machinery will be required by Batch & Rippin, Falkirk, Ont., who will erect a plant there for the manufacture of cement tile, etc.

La Campagnie des Grantis du Nord, Limitee, Montreal, has been incorporated with a capital stock of $149,000 by J. T. Lafond, St. Scholastique; Leon Lafond, Outremont, Que., and others, to manufacture granite, etc.

The Brantford Scale Company, Dalhousie street, Brantford, Ont., will erect a factory.

Christie & Co., St. John, N. B., will make additions to their factory.

The utilities commission, Peterboro, Ont., has practically decided to install an auxiliary steam plant at the pumping station. William Kennedy, Jr., is the engineer.

The Trenton Cooperage Mills, Spragg street, Deer River, Ont., will rebuild next spring at a cost of $12,000 its plant recently destroyed by fire.

The Gilmour Lime & Gravel Company, Ltd., Toronto, has been incorporated with a capital stock of $75,000 by H. A. Hall, 406 Leslie street; Louis F. Blach, J. J. Flint and others, to manufacture products of clay, sand, cement, etc.

Tenders for pump house sewage and pumps for Hamilton, Ont., estimated to cost $130,000 will not be called for until next summer. A. F. Macallum is the city engineer.

Government Purchases

WASHINGTON, D. C., December 14, 1914.

Bids will be received by the Bureau of Supplies & Accounts, Navy Department, Washington, December 29, schedule 7647, ordnance, class 21, for one automatic motor-driven machine for Newport; until January 5, schedule 7696, one 24-in. x 12-ft. lathe; three 14-in. x 6-ft. lathes; three 16-in. x 6-ft. lathes; one universal milling machine, and one wire feed screw machine, all for Washington, D. C.; schedule 7701, miscellaneous safety type lathe dogs; and schedule 7714, eight trolley hoists for handling 14-in. shells, all for Brooklyn.

Bids were received at the Bureau of Supplies & Accounts, Navy Department, Washington, December 8, schedule 7577, steam engineering, class 81, for two heavy-duty engine lathes for Charleston—The Fairbanks Company, $1314; E. L. Fraser, $1515 and $1525; Hendey Machine Company, $1321; I. H. Johnson, Jr., & Co., Inc., informal; Kent Machinery Company, $1417, $1362 and $1099; Manning, Maxwell & Moore, $1795, $1845, $1785, $1509, $1545, $1534, $1350 and $1338; D. Nast Machinery Company, $1025; Niles-Bement-Pond Company, $1591; The Rahn Larman Company, $1400.

Trade Publications

Steel and Iron.—Pratt & Inman, Worcester, Mass. Collection of loose leaf circulars. Contains a list of the various extras that are charged for different forms of iron and steel, together with a list of the weights of different shapes. A list of sizes of refined and Norway iron, soft steel sheets and tool steel that is regularly carried in stock is included together with a list of the amounts.

Portable Tools.—Stow Mfg. Company, Binghamton, N. Y. Bulletin No. 400. Treats of a few of the numerous portable tools built by this company. The line covered includes bench and breast drilling machines, a flexible boring machine, tool post and bench grinding machines and a suspended drilling machine. Illustrations and brief descriptions of the various tools are included.

Deseaming Process for Rail Sections.—Lackawanna Steel Company, Lackawanna, N. Y. Pamphlet. Relates to the process employed by this company to eliminate seams in steel rails. The pamphlet is illustrated with numerous sections of steel, and a number of views of the stages in the process of manufacturing.

Feed Water Treatment.—American Boiler Life Company, 19 North Market street, Boston, Mass. Brochure, entitled Steam Boilers and Boiler Feed Water. Relates to the presence in boiler feed water of scale forming impurities and the way in which they are eliminated. The advantages of the chemical method of removing these injurious elements as compared with the mechanical removal of the scale after it is formed are briefly touched upon.

Steam Hammers.—Erie Foundry Company, Erie, Pa. Calendar. Each of the leaves of the calendar contains illustrations of the various types of hammers built by this company, and mention is made of other lines, such as trimming presses, galvanizing and shearing machinery.

Contractors' Equipment.—C. H. & E. Mfg. Company, Inc., Mineral street, Milwaukee, Wis. Folder. Contains numerous illustrations of various pieces of contractors' equipment, such as hoists, pumps, chutes, saws, material elevators, engines, etc. No descriptive matter is included in the folder, reliance being placed entirely upon the engravings to describe the line.

Crankshaft Forgings.—Park Drop Forge Company, Cleveland, Ohio. Catalogue. The 64 pages, with but four exceptions, are devoted to illustrations of various crankshaft and axle forgings that have been supplied to builders of automobiles and motor trucks.

Pneumatic Forging Hammer.—H. Edsil Barr, Erie, Pa. Circular. Calls attention to a pneumatic hammer for light forging work which was illustrated in *The Iron Age*, November 19, 1914. A description of the hammer is presented with views showing the features mentioned in the text. Mention is also made of a smaller hammer designed for toolroom forging and copper and jewelry work.

Electric Pyrometers and Indicators.—Wilson-Maeulen Company, 1 East Forty-second street, New York City. Pamphlet. Shows a line of indicators for use with electric pyrometers and the thermo-couples employed in connection with the pyrometers. One of the particular features of the latter is a base metal thermo-couple that is interchangeable. Views of this thermo-couple, as well as the pyrometers tubes used with the indicators, are included.

Cancelling Daters for Revenue Stamps.—James H. Matthews & Co., 3942 Forbes street, Pittsburgh, Pa. Set of circulars. Describes a line of stamps for cancelling the revenue stamps required to be affixed to various documents by the new war tax law. The cancelling stamps can be furnished with any name or combination of initials and have sufficient type to enable them to be used for seven years.

Governors.—Massey Machine Company, Watertown, N. Y. Catalogue No. 7. Relates to a new governor intended for use in place of the more expensive Jahns' type. Illustrations of the governor and the way in which it operates are used to supplement the text matter, and a number of dimension tables and diagrams are included.

Power House and Machine Shop Equipment.—L. A. Green Equipment Company, 3145 Penn avenue, Pittsburgh, Pa. Mailing card. Calls attention to the equipment for power houses, railroads, machine shops, coal mines and contractors' plants that this company can supply.

Air Compressor.—Chicago Pneumatic Tool Company, Fisher Building, Chicago, Ill. Bulletin No. 34-F. Relates to a line of small power-driven air compressors for use in garages, stone yards, central stations and numerous other places where compressed air is used. The compressors are arranged for belt and gear drive from electric motors, gasoline engines, etc. A brief description of the compressor is given, the text being supplemented by a number of illustrations, and views with dimension tables of the various styles of compressors that can be supplied are included.

Power and Steam Pumps.—Smart-Turner Machine Company, 191 Barton street, East, Hamilton, Canada. Catalogue No. 9. Illustrates a line of power and steam pumps. In making up the catalogue, which covers triplex and double acting power, low and high lift centrifgual, double suction, automatic feed, bilge and motor-driven rotary pumps, two pages are given to each style, an engraving being presented on one with a brief description on the other.

Crucible Steel.—Crucible Steel Company of America, Henry W. Oliver Building, Pittsburgh, Pa. Catalogue. Lists the products of the Atha Steel Works which include high-speed, tool, special alloy and machinery steels, forgings, disks, die blocks, shafts, gun forgings and special analysis steels. Brief descriptions of the various products are presented, with illustrations showing some of them and the way in which they are made. Tables of weights and various other useful information are included.

Portable Crane.—Walter A. Zelnicker Supply Company, St. Louis, Mo. Form No. 3. Describes by a series of illustrations the use of a portable floor crane and hoist in factories and machine shops. A brief description of the device is presented, together with a complete table of dimensions.

Concrete Curb Bars.—Trussed Concrete Steel Company, Youngstown, Ohio. Pamphlet. Calls attention to a number of steel products for use in connection with concrete work, such as a curb bar, armor plates for protecting expansion joints, reinforcing metal and steel forms. An illustrated description of the curb bar, which is designed to protect the edges of curbs, columns, steps, etc., appeared in *The Iron Age*, August 27, 1914.

Concrete Block Machinery and Derricks.—Helm Brick Machine Company, Cadillac, Mich. Collection of circulars. Calls attention to a line of machines for making concrete blocks of various sizes and styles and the machinery used in connection with them, such as concrete mixers, derricks, etc. Illustrations and brief descriptions of all of the machines are presented, together with engravings showing the different kinds of bricks that are turned out.

Concrete Building Construction.—Turner Construction Company, 11 Broadway, New York City. Folder. Presents a compilation of cost data, giving an accurate record of the comparative cost of the representative concrete buildings erected at any time during the past seven years. The curve shows a marked reduction in the cost of the buildings up to the present time and the reasons for this decrease are presented. A number of views of factory buildings that have been erected by this company are included.